THE IRON AGE

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Water-Cooled Equipment for Sheet Mills

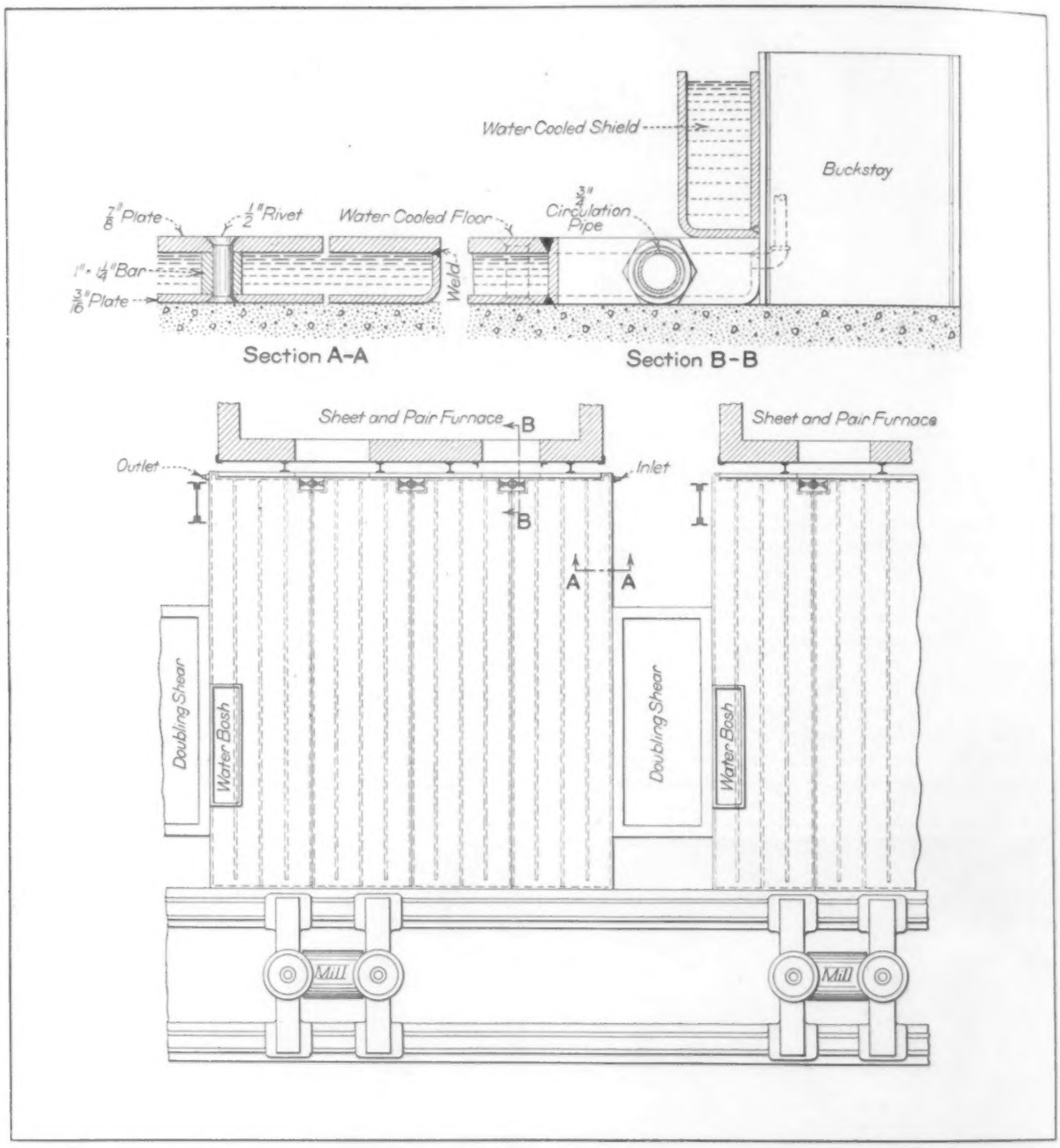
Furnace Shields and Flooring for Steel Works—Palm Oil Melting Plant —New Design of Annealing Boxes

Some new designs of equipment for open-hearth steel works and sheet and tin-plate mills have been developed by the Knox Pressed & Welded Steel Company, Farmers Bank Building, Pittsburgh, Pa. They include water-cooled shields for furnaces, floor standing, palm oil melting plant and a type of annealing box with an arched roof. All of the equipment was designed by L. L. Knox, president of the company, and is protected by patents.

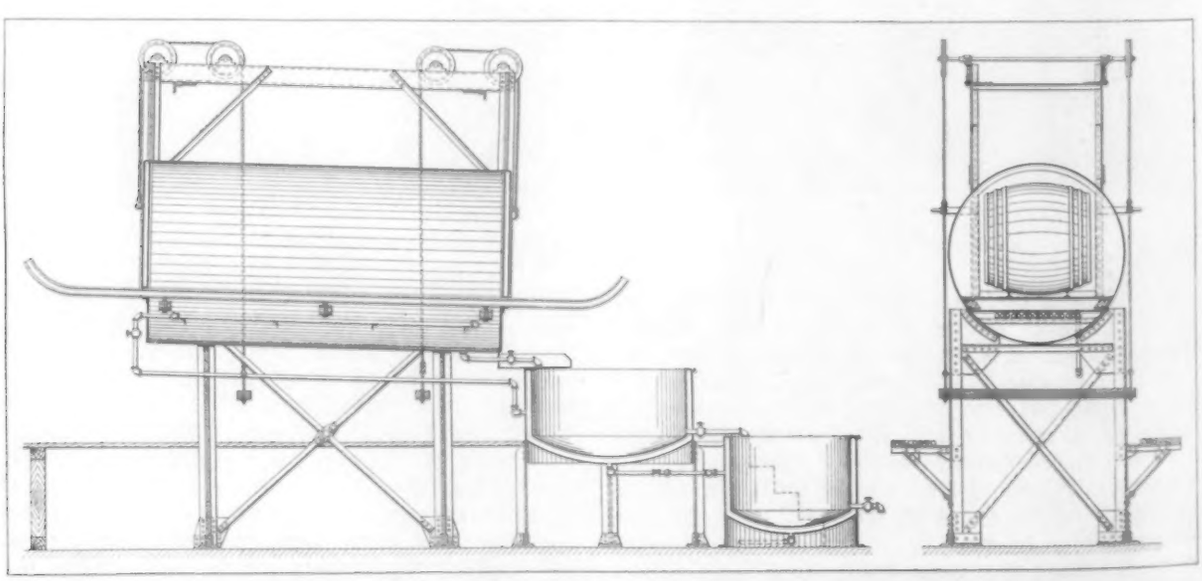
The water-cooled shield is designed for use as a substitute for the older method of protecting furnace-door openings by an open sheet of water, which is being discarded in modern sheet mill practice. The chief feature of interest in the construction of the shield is that the workmen are protected from the intense heat of the furnaces not at the doors alone but also over the entire front of the furnace. A space is left in the center for the air reservoir which has two swiveled elbows. This arrangement results in a current of fresh air blowing constantly on the operator, irrespective of the position in which he may be. Openings are provided through which the ropes controlling the dampers and the doors are manipulated. No water is exposed, which would would otherwise tend to raise the humidity in the plant. The draft caused by the heat in the space left between the furnace front and the water-cooled shield is relied upon to carry off any gases and smoke. Washout connections are provided, and the water supply and outlet are placed to obviate air or steam pockets from forming inside the shield.

The water-cooled floor, which is designed to be used in connection with the furnace shields is found to improve the conditions for the men working about the sheet heating and pair furnaces and rolls by providing a cool floor for them to stand upon when doing their work and also cooling the air at the furnaces. These floors, which are of the builder's standard construction, are made of wrought steel throughout, with a view to eliminating breakage. The floor consists of sections 5 ft. wide of $\frac{3}{8}$-in. rolled top plate and a bottom plate of half that thickness, welded together at the edges of the sections. In the 1-in. space between the upper and lower floor plates for the water are baffles of 1 x $1\frac{1}{4}$-in. bars, which are riveted in place to divide the section of the floor into four cham-

An Installation of Water-Cooled Furnace Shields and Floor in a Sheet and Tin-Plate Plant

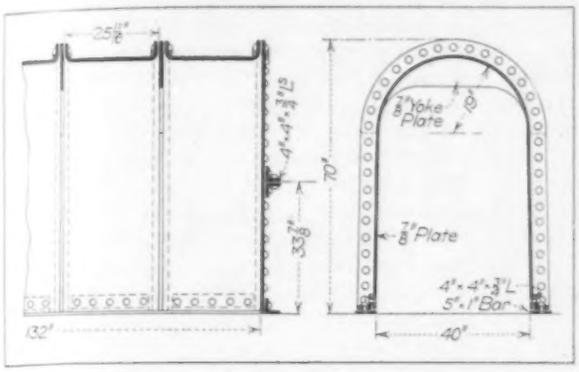


Details of the Water-Cooled Floor for Sheet and Tin-Plate Mills and the General Arrangement of the Floor



Sketch Showing the General Arrangement of a Plant for Melting the Casks of Palm Oil

bers of equal width and to cause a complete circulation of water back and forth as indicated in the illustrations. The sections of the floor are connected at one end by a ¾-in. pipe, thus making the floor a continuous unit, irrespective of the number



A New Annealing Box with an Arched Roof and Upturned Flanges at the Joints

of sections and doing away with the necessity of having more than one supply pipe and outlet to each standing.

The arrangement of the floor in connection with a pair of furnaces is brought out in one of the accompanying drawings, while details of the baffles and the method of connecting the various sections of the floor are also presented. The water bosh or extension tank is welded to the upper floor plate and holes are drilled in the latter to admit the water, the level of which is regulated by the elevation of the outlet. Ordinary circulating water is relied upon to keep the floor cool in summer, while by heating the water employed in winter the floor is kept warm.

In the palm oil melting plant, the utilization of the principle of gravity simplifies the operation. The object of this plant is to reduce the palm oil from the solid state, in which it is shipped, to a liquid without any loss of casks or oil. The casks containing the oil are rolled into the steam heated melting chamber upon tracks, beneath which is located a steam coil, and remain there until the oil is thoroughly melted. During the melting process oil oozes through the crevices in the cask into the melting chamber and is carried by a pipe to the first refining kettle, which has a steam jacket. After the oil in the cask is thoroughly melted the chamber door is opened and the casks are run out on tracks to have their contents emptied into the first kettle, where the water is driven off and the foreign substances permitted to settle. The refined oil is then drawn off above the line of the sediment into a second steam-jacketed kettle at a lower level, where it is kept at the desired temperature for use. The chamber and the kettles are of the builder's standard welded steel construction, and the former is supported on a rigid structural steel base with galleries to give access to all parts.

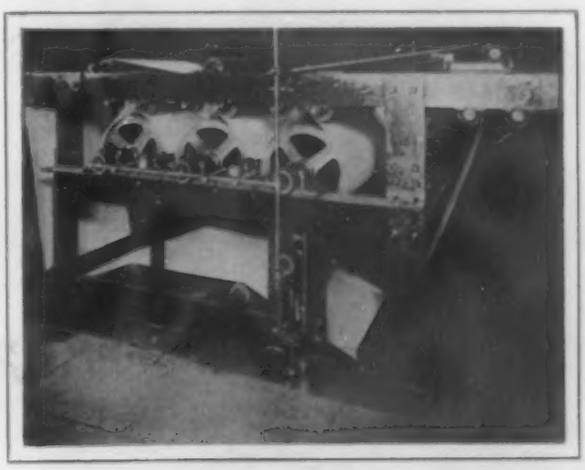
The features of the annealing box are the elimination of the ordinary riveted lap joint by the turning out of the flanges which also has a tendency to reduce the dead air space on the inside of the box, the use of an arched roof and the making of all the units of the same size. The turning out of the flanges of the units enables them to be joined up singly, without penetrating the main body of the plate by rivets. A ⅞-in. filler plate, which is riveted in between the flanges, is also inserted at the joint and is carried over the top like a yoke, thus giving a truss-like frame for the top of the box. Another purpose of the flanges is to reduce the dead air space on the inside of the box. All of the units of the annealing box are the same size, 25-11/16 in. wide, which it is emphasized results in a reduction of the repair costs, as the units can be replaced without scrapping the box. The rivets employed are of special design and special analysis steel and are said to give a much longer life to the box than is secured when rivets made from ordinary steel are used.

At the present time, all of these devices are in use in a number of the leading sheet and tin-plate mills in the United States. One of the tin-plate mills in the Wheeling district has had its premises completely equipped with the water-cooled shields, this installation being the one shown in the accompanying halftone.

Blueprint Drying and Ironing Machine

A machine rated to dry and iron 2000 blueprints of ordinary size per hr. has been designed by James W. Townsend, 49 West Sixteenth street, New York City. The machine, as shown, consists essentially of three large rolls, 18 in. in diameter, and a smaller or ironing roll. Two continuous sheets of cloth are employed to convey the wet print through the machine, the print being carried through between the two sheets. The frame is of structural sections, which it is emphasized enables new parts to be secured easily in the remote event of breakage. The rolls, which are 30 in. wide, and the ironing roll are heated by gas, the supply pipe passing in through the open center into the interior of the roll. A small air chamber, similar to that used on the burner of an ordinary gas stove, is located just inside the entrance to the roll, and the pipe makes two right-angle turns, the last length of pipe running the entire width of the roll and close to the inner circumference. This pipe is perforated with a series of small holes, and the gas is ignited by the introduction of a lighted taper. The supply of gas is regulated by the valve shown on the vertical pipe.

The machine is motor driven, the power being transmitted through a series of reduction wheels to the driving pulley. This is located on the opposite end of the shaft, which can be seen projecting to the left of the middle roll. A pinion on this shaft meshes with gears on the adjacent rolls and the gear on the middle roll in turn meshes with a second



A Recently Developed Machine for the Continuous Drying and Ironing of Large Quantities of Blueprints, etc.

pinion that transmits power to the roll at the right end. The ironing roll operates by friction, the amount being varied by the take-up shown underneath it at the right of the machine. Adjustments

for varying the tension on the two sheets of cloth are provided. These are located at the upper right and the lower left corners of the machine, the former being clearly shown in the illustration.

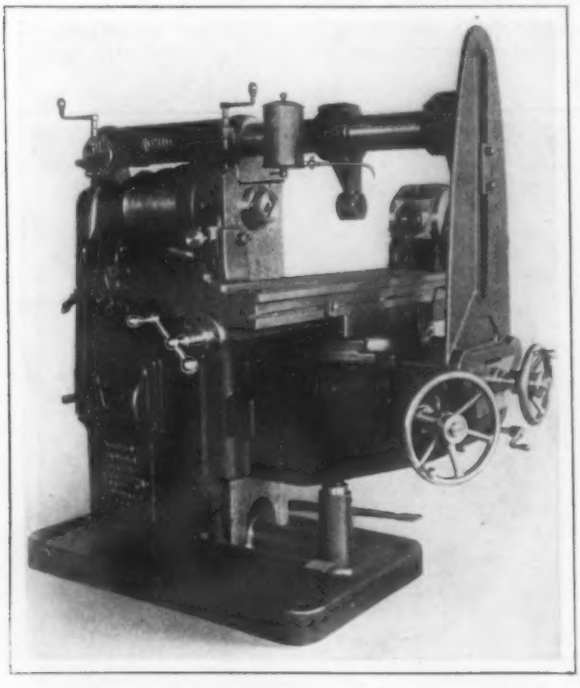
In operation the prints as they are taken from the washing tank are fed into the machine at the upper left end of the machine and pass along on the moving cloth. As there is a distance of 2 ft. between the edge of machine and the first roll, it is pointed out that the operator has plenty of chance to make certain that the print is smooth before it passes into the machine. The prints pass around the first roller, where practically all of the water on the surface of the print is removed. In its passage around the second or middle roller, the print becomes practically dry and then passes between the third roller and the ironing roll for final drying and ironing. The diameter of the roll at the exit side of the ironing roller is made small to insure the delivery of the print in a flat condition.

Other applications of this machine are the drying of photographs, wall paper, ferrotype plates, etc.

An Improved Universal Milling Machine

A universal milling machine, including among its equipment a patent belt shifting arrangement and an interesting arrangement for controlling the quick power movement of the knee, saddle and table, has been developed by the Oesterlein Machine Company, Cincinnati, Ohio. These arrangements eliminate the shifting of a heavy belt, the returning of the table after a cut, or making long adjustments by hand. The control levers are all centralized in a convenient position for the operator. In addition to the universal machine a plain type is built, the two styles being identical except for the swiveling saddle.

The construction of the machine is somewhat massive, and the parts which are generally responsible for vibration, it is pointed out, are rigidly built. The column, which is 13½ in. wide, and the base are cast in one piece with a heavy front wall, to serve as a slide for the knee and the main spindle support. The bearing on this slide for the knee extends 5½ in. above the top of the latter, which tends to reinforce the column and give a long vertical guide. It is emphasized that in this way rigidity and accurate vertical movement are secured. Recesses or large openings are not found in the sides of the knee and the top is solid, both at the front and back, and is reinforced by a heavy box rib, which is located slightly below the center opening. This opening is spanned entirely by the saddle when it is directly over the former, and the advantage claimed for this construction is that the cross screw can be placed in line with the spindle center.



A Recently Developed Universal Milling Machine Equipped with a Special Belt Shifting Mechanism and a Treadle Control for the Rapid Power Traverse of Knee, Saddle and Table

The machine is driven by a cone pulley of large diameter, the smallest step measuring 10¼ in. With a view to reinforcing the power obtained in this way, the spindle has a positive drive for the arbor by an interlocking recess and flat. The spindle, which is of special steel, runs in bronze bearings, lubricated from oil wells located in the column, and provision is made for taking up wear. The belt shifting mechanism enables the belt to be moved from one step of the cone pulley to the next by a single turn of the handwheel, and the movement of the lower fork is transmitted to the countershaft overhead, which it is pointed out places the belt in the desired position on the countershaft cone pulley practically instantaneously. This arrangement protects the operator from bodily injury and also gives practically all the advantages of a single-pulley type of machine.

From the spindle the feed is transmitted by a roller chain to the feed box, where all the changes, 16 in number, are controlled. Only four of the rates of feed leave the box running faster than the spindle. From the feed box the feed is transmitted through a universal joint and telescopic shaft to a tumbler in the knee, which is designed to reverse all the feeds. From here the feed is distributed to the table, saddle and elevating screws, it being emphasized that this method of delivering power to the feed screw avoids all torsional and radial strain. The driving gear is mounted to float on a hardened and ground steel sleeve, through which the screw passes, and is clutched into another sleeve, mounted and keyed upon the screw immediately alongside the lead screw nut.

The arrangement for quick power movement of the knee, saddle and table consists of a fleeting motion for whatever feed is engaged and is operated by depressing one of the treadles located at either side of the machine base. These treadles are connected by levers and shafts to a fork operating a clutch at the rear of the machine which is normally engaged with a gear driven from the feed box. When the clutch is shifted by depressing the treadle it becomes engaged with the quick speed from the lineshaft, and when the treadle is released th clutch automatically engages with the feed box speed that is being used. This arrangement, it is pointed out, eliminates all chance of error through its use, as the device does not in itself engage the feed. Safety stops are provided at the limits of all motions.

For cutting spirals on these machines, a universal milling attachment is employed, so that the cutter can be set at an angle. This arrangement takes the place of swiveling the table.

The smallness of Germany's trade with Canada as compared with that of the United Kingdom and the United States is shown by a special report of His Majesty's Trade Commissioner for the Dominion, in which it is stated that for the fiscal year ended March 31, 1914, the value of German goods imported was £12,900,000, against £28,500,000 from the United Kingdom and £90,600,000 from the United States.

Grinding Large Shells and Projectiles

The Norton Grinding Company's Practice as Adopted by Important Manufacturers Described by C. O. Smith

Fig. 2—Shrapnel Blanks

Clayton O. Smith, sales manager of the Norton Grinding Company, Worcester, Mass., read an interesting paper at the recent conference of Norton employees, on the development of grinding machinery for the manufacture of war munitions and equipment. We print herewith what he had to say regarding the grinding of projectiles, together with the illustrations.

In Fig. 1 is shown one of the Norton 18 x 96-in. self-contained motor-driven machines in the projectile department of the Bethlehem Steel Company, South Bethlehem, Pa., for grinding projectiles ranging 10, 12, and 14 in. in diameter. The wheels used on this work are 24 x 2 x 5, 24-L or M. About 0.040 in. is removed from the diameter when finish grinding. The limits are plus or minus 0.0005 in., and the average time on a 12-in. projectile, grinding the body only, is 40 min.

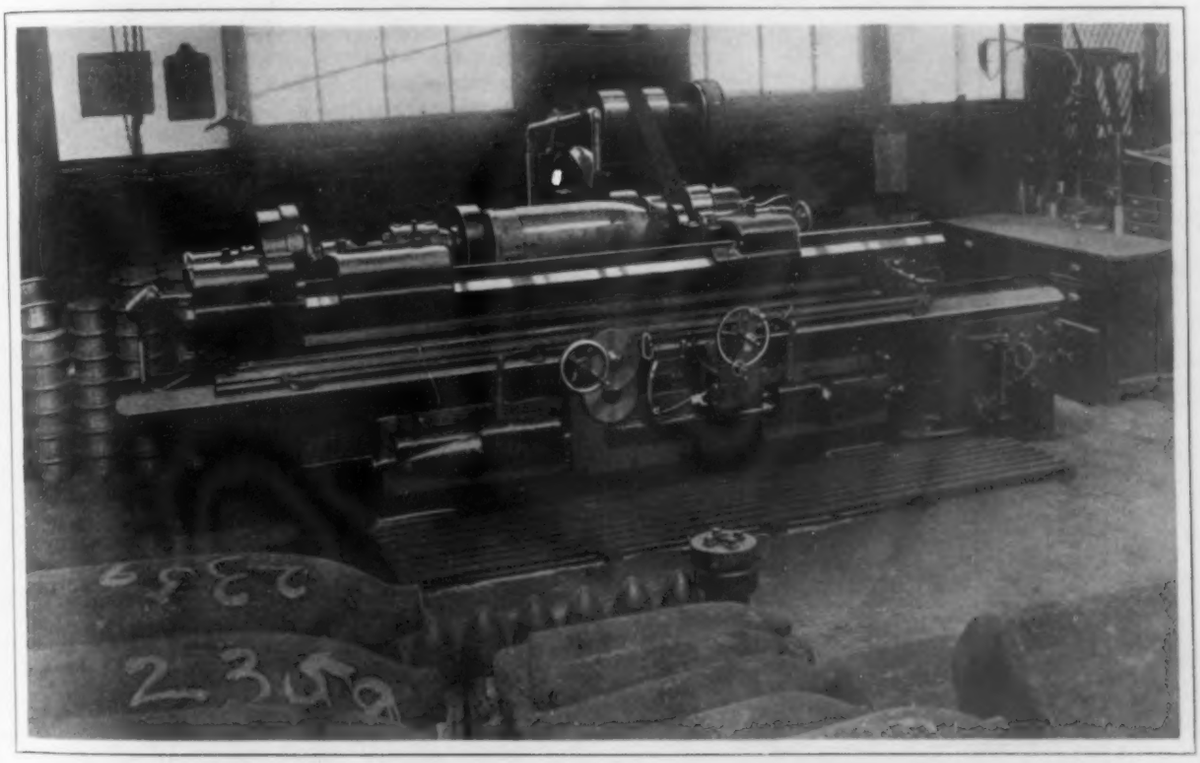


Fig. 1—An 18 x 96-In. Norton Plain Grinding Machine Equipped for Grinding Projectile Bodies

As to machines for grinding shrapnel the Norton Grinding Company is prepared to speak with considerable authority, as it has made a thorough study of the subject and is carrying on still further investigations. The blanks shown in Fig. 2 were made for the purpose of demonstrating what could be done on the 6-in. and 10-in. machines.

Fig. 3 illustrates the English 15-pounder shell ground on the nose and body only. The diameter at the closed or headstock end of the shell is finished in the lathe.

The English 15-pounder shell ground on all diameters is seen in Fig. 4. The Canadian manufacturers are producing these shells by the two-operation process. The E. W. Bliss Company, to which were sold 10 machines, is finishing them by the three-operation process. During the past two weeks machines have been sold into Canada, and the prospects in that territory are very bright for large sales after these machines have been demonstrated.

The French shell, with the three-operation process, Fig. 5, is practically the same as the English shell, except in minor details. The samples were made up in accordance with the French specifications as the demonstration just mentioned was in connection with an order for 16 machines from L'Eclairage Electrique, Paris. The blanks had been rough turned to 0.015 in. over finish size and were ground to a limit of plus or minus 0.004 in. Three machines were set up for the three operations shown, one operator making the complete demonstration on a lot of five blanks.

Operation No. 1: 5 pieces in 2 min. 30 sec., or 120 per hour.

Operation No. 2: 5 pieces in 3 min., or 100 per hour.

Operation No. 3: 5 pieces in 2 min. 30 sec., or 120 per hour.

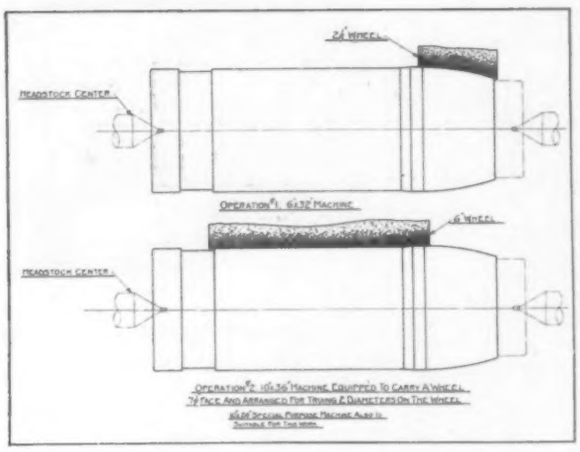

2½" WHEEL
HEADSTOCK CENTER
OPERATION #1. 6x32" MACHINE
6" WHEEL
HEADSTOCK CENTER
OPERATION #2. 10x36" MACHINE EQUIPPED TO CARRY A WHEEL
¾" FACE AND ARRANGED FOR TRUING Z DIAMETERS ON THE WHEEL
10x24" SPECIAL PURPOSE MACHINE ALSO IS SUITABLE FOR THIS WORK

Fig. 3—The Two-Operation Process of Grinding English Shrapnel

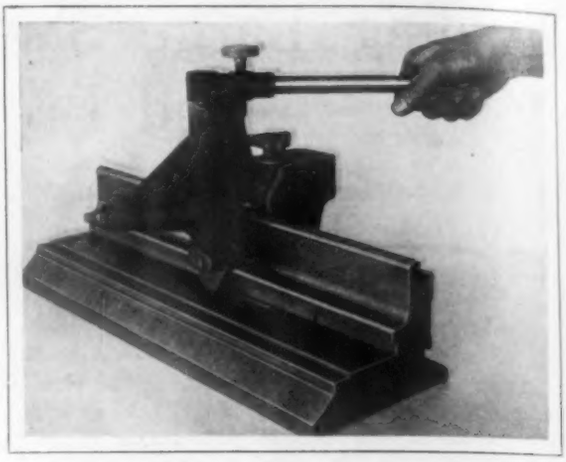


Fig. 6—The Radial Truing Device for Shrapnel Work, 6-In. Machine

The guarantee on which the order for the above mentioned 16 machines was secured was:

Operation No. 1, 90 pieces per hour.

Operation No. 2, 70 pieces per hour.

Operation No. 3, 75 pieces per hour.

If labor conditions are such that one man is allowed to operate two machines, we recommend that the 6-in. machine for operation No. 1, and 10 x 36-in. machine for operation No. 3 be provided with power crossfeed, without table traverse, and the production guarantees slightly reduced; a unit of equipment would then be made up as follows:

Operation No. 1: two 6 x 32-in. machines; one operator; 120 shells per hour.

Operation No. 2: two 6 x 32-in. machines; two operators; 120 shells per hour.

Operation No. 3: two 10 x 36-in. machines; one operator; 120 shells per hour.

All shells must be rough turned ready for grinding and our guarantees of production are based on removing not to exceed 0.015 in. from the diameters with the grinding wheel, working to a limit of plus or minus 0.004 or 0.005 in.

The samples have two qualities of finish. The rough finish is demanded by the Canadian inspectors as the surface must hold paint. Fortunately, we can determine the finish by selecting the proper work speed and grinding wheel. The best wheel we have found to date for producing the rough finish on the first is ½-24, ½-36 K vitrified, or L silicate. To obtain the good finish, we recommend 24 comb, grade K, vitrified wheels.

The 6 x 32-in belt-driven machine is recommended for operations Nos. 1 and 2. For operation No. 1 a 12 x 1½ wheel is used, while for operation No. 2 wheels 14 in. in diameter and ranging up to 2⅜-in. face, depending on the length of the nose curve. Aside from the grinding wheels the equipment is identical for these two operations.

Fig. 6 shows a device for truing the wheel to obtain the nose curve. It is a very simple attachment which clamps to the table as indicated. The

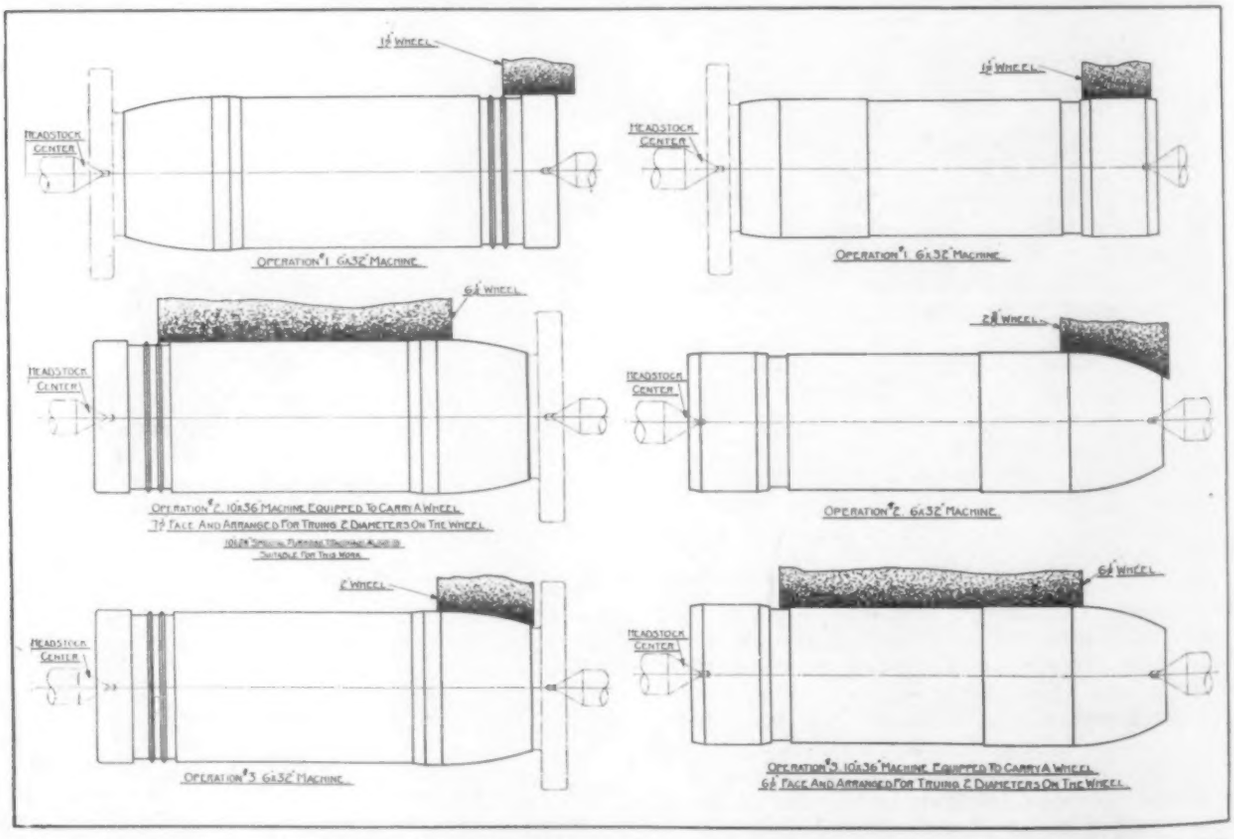

1½" WHEEL
HEADSTOCK CENTER
OPERATION #1. 6x32" MACHINE
6½" WHEEL
HEADSTOCK CENTER
OPERATION #2. 10x36 MACHINE EQUIPPED TO CARRY A WHEEL
¾" FACE AND ARRANGED FOR TRUING Z DIAMETERS ON THE WHEEL
10x24" SPECIAL PURPOSE MACHINE ALSO IS SUITABLE FOR THIS WORK
2" WHEEL
HEADSTOCK CENTER
OPERATION #3. 6x32" MACHINE

Fig. 4—The Three-Operation Process of Grinding English Shrapnel

1½" WHEEL
HEADSTOCK CENTER
OPERATION #1. 6x32" MACHINE
2⅜" WHEEL
HEADSTOCK CENTER
OPERATION #2. 6x32" MACHINE
6½" WHEEL
HEADSTOCK CENTER
OPERATION #3. 10x36" MACHINE EQUIPPED TO CARRY A WHEEL
6½" FACE AND ARRANGED FOR TRUING Z DIAMETERS ON THE WHEEL

Fig. 5—The Three-Operation Process of Grinding French Shrapnel

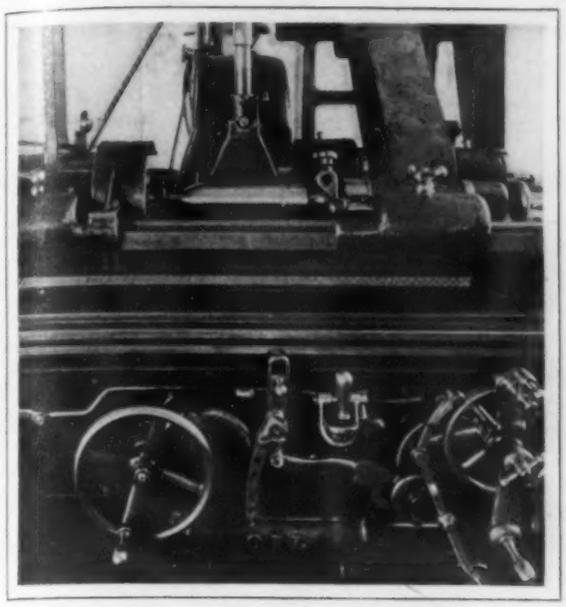


Fig. 7—The 10 x 36-In. Machine with Wide Wheel—Shrapnel Blank on Centers

knurled head screw is provided for locking the swivelling member when truing a straight face on the grinding wheel. By withdrawing the screw from its slot the swivelling member can be rotated through the required arc for producing the nose curve.

The Norton standard 10 x 36-in. belt-driven machine, for shrapnel grinding, or work of similar character, is arranged to carry a grinding wheel 20 in. in diameter up to 7½-in. face, as shown in Fig. 7, with the shrapnel blank on centers. The wide wheel, as well as the large-diameter wide-face spindle pulley may be noted. These machines are found to absorb a maximum of 40 hp. and as a measure of precaution we provide vertical stops on the wheel slide to prevent its lifting under the heaviest cuts. Attention is also called to the two diameters on the work. These two diameters are obtained by means of the micrometer crossfeed. Inasmuch as there is but 0.010-in. difference between these on a shrapnel shell, the variation in wear of the wheel on these two diameters is negligible.

The 10 x 24-in. special purpose machine was primarily designed for the Ford Motor Company, as described in *The Iron Age* of January 7. These machines are equipped with wheels 20 in. in diameter up to 7½-in. face. This is the type of machine sold to the E. W. Bliss Company for grinding the body of shrapnel shells. It is not provided with power table traverse, but has a table traverse screw at the righthand end of the base for truing the grinding wheel. The removal of a horseshoe washer from between the hub of the handwheel and the screw bearing permits the movement of the table a maximum distance of 3 in. by the rack and pinion at the left front of the base.

Fig. 8 shows the method of grinding the inside of the shrapnel shell as offered by the Heald Machine Company, Worcester, Mass. The grinding wheel is formed for producing the curvature at the open end, and a former, or two settings of the spindle, are required for producing the inner surface, as the shell in this case has two tapers.

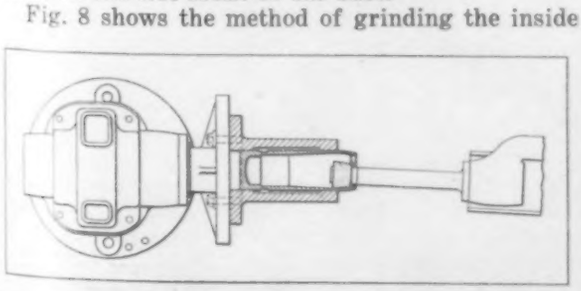


Fig. 8—A Heald Machine Arranged for Grinding Shrapnel Internally

Substituting Bronze Castings for Steel

The McGill Metal Company, Valparaiso, Ind., is casting copper base metal compositions in permanent steel molds or dies. These castings are designed as substitutes for machine parts formerly made of steel, the advantage claimed for this method of production being that the expense of machining, grinding, hardening, finishing, etc., is practically eliminated. At the present time the company is producing bevel gears of small sizes in large quantities by this method.

The structure of the casting is said to be finely granular or fibrous, dense and homogeneous. The castings can be forged red hot or cold and machined easily. It is emphasized that vibrations, shocks, strains and a reasonable amount of heat do not influence the grain of these castings. A high polish can be secured, and tests made of the gears with heavy loads and at high rates of speed are said to have shown practically no wear, even though no lubricant was employed.

Physical tests of the material gave a tensile strength of from 75,000 to 85,000 lb. per sq. in., with an elastic limit of 30,000 to 40,000 lb. The elongation in 2 in. ranges from 18 to 23 per cent., and the reduction of area was between 17 and 24 per cent.

American Society for Testing Materials

The American Society for Testing Materials will hold its eighteenth annual meeting at Atlantic City, N. J., at the Hotel Traymore, June 22 to 26 inclusive. An amendment is proposed to the by-laws providing for the publication in each Year Book of proposed new standards or amendments to existing standards approved by a two-thirds vote of a meeting but still subject to a vote at the regular meeting a year following before the standard can be regularly adopted.

The membership is being asked to indicate by a letter ballot whether it believes that the adoption of standards should be determined by a letter ballot of the society at large or whether this policy should be abrogated.

British Iron-Ore and Pig-Iron Output in 1913

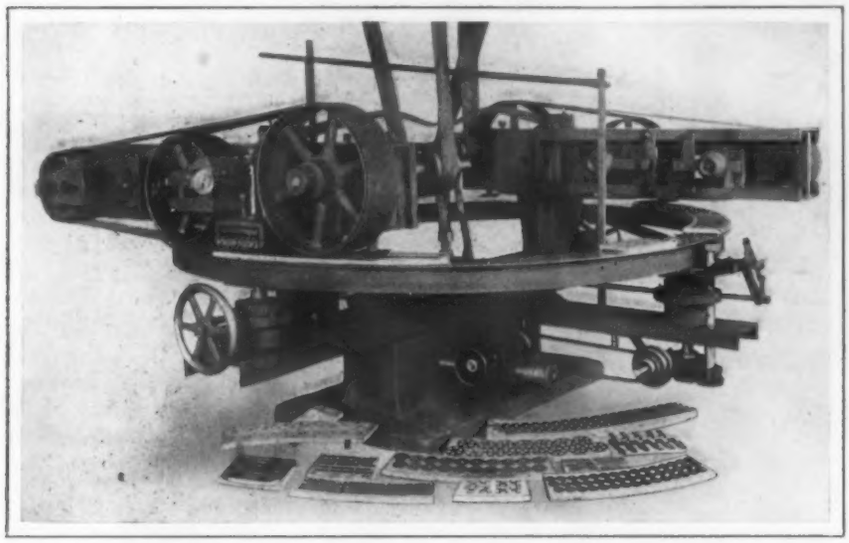
The United Kingdom's output of iron ore in 1913, according to recent official figures, was 15,997,328 gross tons, valued at £4,543,558, compared with 13,790,391 tons, valued at £3,763,837 in 1912, an increase of 2,206,937 tons. The pig iron obtainable from British ores in 1913 is given as 5,138,958 tons, valued at £22,096,984 against 4,451,636 tons, valued at £16,419,298 in 1912. The total pig iron produced in 1913 was 10,260,315 from 25,707,518 tons of ore, against 8,751,464 tons from 21,958,969 tons of ore in 1912. The average price per ton of the ore mined in 1913 was 5s. 9d. ($1.40) as compared with 5s. 5d. ($1.32) in 1912.

An Electrical Carnival Week, beginning October 18, to be held in the United States and Canada, is suggested by the Society for Electrical Development, which held a meeting of electrical manufacturers, jobbers, contractors, dealers and others, recently in New York City, to discuss the subject. It is felt that such a week would call attention in a forcible manner to many uses of electricity not apprehended and would tend to impart a boom to general business.

The Niagara Frontier Purchasing Agents' Association, John H. Burns, McCarthy Bros. & Ford, Buffalo, N. Y., president, has changed its name to the Purchasing Agents' Association of Buffalo, as better expressing the scope and membership of the association. Meetings are held at the Buffalo Chamber of Commerce.

A Two-Belt Rotary Polishing Machine

For automatically finishing hardware and other small parts, John C. Blevney, 209 Parkhurst street, Newark, N. J., has brought out a two-belt polishing machine. The general principle of the machine is the same as that of the builder's tube polishing machine, which was illustrated in *The Iron Age*, March 17, 1910. That machine, however, was intended only for giving the tubing or other material but one treatment with the polishing belt, while in this machine two belts are used, one for roughing and the other for finishing, and the table has a rotary motion instead of a reciprocating one.



A Recently Developed Machine for Automatically Finishing Hardware. It is Equipped with Two Polishing Belts and a Rotary Table

The machine uses two abrasive belts passing over the two outer pulleys, while a leather belt running over the middle pulley and one of the outer ones inside of the abrasive belt drives the latter. The pressure of the abrasive belt on the work to be finished is secured by the weight between the middle pulley and the right hand one for the belt shown at the front of the machine. The leather belt has a series of V-shaped ridges extending across its entire width, which provides a cushion and permits pockets in the abrasive belt to hold the grindings and carry them off the work without scoring the latter. The weight on the inner side of the belt is sufficient to keep the latter in contact with the surface of the material being polished and also permits the abrasive belt to follow irregularities in the surface of the material.

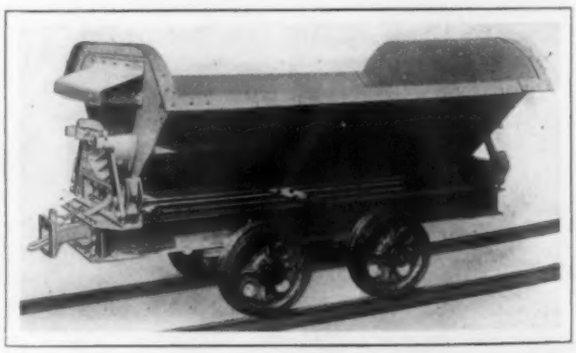
In operation, boards filled with a number of identical pieces are placed on the table as the machine rotates it, feeding them first under the roughing belt and afterward under the finishing belt, bringing them back to the operator to be replaced with other work. The long handle extending across the machine controls the motion of the table. When this handle is depressed the feeding of the table and the grinding are stopped, although the belts continue to move. When this lever is depressed, the table may be moved by hand in either direction on the roller bearings. Gears 2 in. in diameter and ⅛ in. thick have been finished on both sides, ready for nickel plating, at the rate of 75 per min. on this machine.

The Service Gear & Machine Company, Reading, Pa., has purchased the stock of gears and shafts of the service department of the American Die & Tool Company, transmission and rear axle manufacturer of the same city.

A Heavy Industrial V-Bottom Dump Car

The Orenstein-Arthur Koppel Company, Koppel Pa., has developed a heavy type of V-shaped dump car for quarry and industrial plant service where heavy materials have to be handled. These cars have a capacity of 2 cu. yd. and have a loading hight of 43 in. The low hight enables them to be easily loaded by hand, although they are constructed for heavy steam shovel loading, and the absence of lift or swinging doors eliminates parts that are likely to get out of order. One of the special features of the car, which is designed for locomotive haulage on a 30-in. gauge track, is that the bearing boxes are located inside the wheels, which are of cast steel. This arrangement, it is emphasized, does away with the breakage of journal boxes and wheels. At the plant of the Pittsburgh Plate Glass Company, where 40 of these cars are in use, it has been found that the maintenance charges have been reduced considerably and a saving in time, which is obtained by not having any cars on the repair track, is also effected.

A flat bottom quarry car, in which the hight from the head of the rail to the top of the body is only 2 ft., has also been developed. This low hight renders it unnecessary for the loader to lift stone up over the side of the car after straightening up. The cars are built for 36-in. gauge track and are arranged to dump to one side only, the door lifting up when the body is tilted by a hoist engaging the side of the car and lifting it. The level capacity of the car is 23 cu. ft.



A V-Bottom Dump Car Having a Capacity of 2 Cu. Yd. That Has Been Developed for Heavy Service in Industrial Plants

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Eye Accidents in Wisconsin

The Industrial Commission of Wisconsin, according to a recent report found that over 70 per cent. of all the injuries to workmen caused by chips, nails and other small objects affect the eyes. Out of a total of 346 cases reported, 32 men lost the sight of one of their eyes entirely, 217 had eyes injured, 75 suffered from lacerations, 7 from impaired sight and 15 from bruises. The causes of the above injuries were as follows: 283 were hit by chips, 14 by nails, 4 by stone from blasts, 3 by bursting water glasses and 42 by other small objects.

The Commission states that of the 70 per cent three-fourths of the eye injuries could be avoided by wearing goggles.

Electrical Precipitation of Dust

The Cottrell System's Commercial Applications Presented to the American Institute of Electrical Engineers—Its Relation to the Iron Industry

Electrical precipitation of dust in gases may play an important rôle in the steel industry's future development. This is a strong impression carried away by not a few of those who attended the Friday morning session last week at the third annual meeting of the American Institute of Electrical Engineers in New York, February 17 to 19. The theoretical and practical applications of this comparatively new principle or invention were impressed on the institute's members by three important papers at this meeting: "Electrical Precipitation—Theory of the Removal of Suspended Matter from Fluids," by W. W. Strong of the Mellon Institute, Pittsburgh; "Theoretical and Experimental Considerations of Electrical Precipitation," by Prof. A. F. Nesbit, University of Pittsburgh, and "Practical Applications of Electrical Precipitation," by Linn Bradley, of the Research Corporation, New York.

Before the presentation of these papers the chairman, P. M. Lincoln, president of the institute, expressed his extreme gratification in being able to call upon Dr. Frederick G. Cottrell, the inventor of the Cottrell system of electrical precipitation as well as the real founder of the Research Corporation. Dr. Cottrell, in prefacing his remarks, stated that his function at this meeting was rather that of an enunciator, in that he was to introduce the subject of the morning by outlining the historical steps that led up to the present development.

HISTORY OF ELECTRICAL PRECIPITATION

The earliest reference to electrical precipitation, said Dr. Cottrell, was in 1824 when a professor of mathematics in Leipzig, Germany, caused the smoke in a smoke-filled bottle to fall to the bottom by an electrical discharge from the wire of a friction machine. He had observed, as others have, how a heavy rain often follows a severe thunder bolt; how sleet and hail often fall increasingly succeeding heavy peals; how cloud bursts are often preceded by heavy storms.

In 1850 C. F. Gothard performed the same experiment of throwing smoke to the bottom of a jar and published an account of it in the Mechanics Magazine of London. Only incidental references to electrical precipitation followed these, one of which was the discharge of dust from a gas, mentioned in Biedermann's Annalen in 1878.

The first technical applications were suggested independently and almost simultaneously in England and Germany. On August 9, 1884, Abel Walker, manager of a large lead works in England, took out patents and on October 2 of the same year Dr. Carl Mueller was granted similar patents in Germany. Walker's patents were the outgrowth of experiments made by Sir Oliver Lodge which the latter had published before the Royal Institute and the Society for Chemical Industry. What Mr. Walker was after was not really electrical precipitation but the studying of the effect of hot and cold bodies on dust-filled air. He noticed that when a hot rod was thrust into dusty air a dark space appeared between the rod and the cloud. In endeavoring to ascertain whether there were any electrical phenomena in these experiments, he electrified the rod and found that the dust was completely driven away from it.

These events brought the subject fairly before the public and future developments date directly from this. Mueller's work in Germany was not so important. The work of these three men is referred to down to recent times, a number of patents appearing but nothing permanent being contributed to technical development. An installation was put in the flues of the smelters at the lead works with which Mr. Walker was connected but it was impractical.

DR. COTTRELL AND THE RESEARCH CORPORATION

In 1905 Dr. Cottrell with others started investigations at the University of California to determine the practicability of these older experiments. The results were satisfactory, the work grew and it became necessary to put it on a more stable basis. This led to the organization of the present institution handling the work. Developed by local capital it grew and became stabilized. Later the patents and all his rights, Dr. Cottrell stated, were turned over to the Smithsonian Institution in order that the profits resulting from the application of the patents, already well assured, might be applied to the advancement of scientific research and investigation. The idea was to render discovery, already made, the mother of new discovery and thus contribute to the scientific and technical development of the industrial arts. For administrative reasons the Research Corporation, organized in 1912, was substituted for the Smithsonian Institution.

The objects of the Research Corporation as stated in its charter are: To provide means for the advancement and extension of technical and scientific investigation, research and experimentation by contributing the net earnings of the corporation, over and above such sum or sums as may be reserved or retained and held as an endowment fund or working capital, to the Smithsonian Institution, and such other scientific and educational institutions and societies as the board of directors may from time to time select in order to enable such institutions and societies to conduct such investigations, research and experimentation. Organized in 1912 as a stock corporation but precluded by its charter from paying dividends and capitalized by a group of gentlemen desirous of furthering Dr. Cottrell's objects, without personal profit, the Research Corporation undertook and successfully accomplished the installation of the Cottrell processes in various industries throughout the country, with the result that in two years' operation its surplus has provided the capital of $20,000 required by its charter, and a fund of over $100,000 for scientific research.

THE MELLON INSTITUTE AT PITTSBURGH

Co-temporaneous with this development was a similar one in Pittsburgh. Prof. Robert K. Duncan, in his system of industrial research into smoke and dust problems and their elimination, planted the seed which ripened into the Mellon Institute of Industrial Research of Pittsburgh, financed by R. B. Mellon of that city, the home of which is to be dedicated this week, a monument to Dr. Duncan's energy. While the work of this institute is principally along the lines of smoke abatement, the two institutions are working together and their patents are being consolidated.

In answering the question as to how far can the development go beyond what has been done, Dr. Cottrell said that Sir Oliver Lodge in his original work had two objects in view; first, the precipitation or collection of industrial fumes and smoke; and second, the precipitation of fog in the open. Much has been accomplished and will be still achieved as to the first. In fog dispelling Dr. Cottrell was confident that in the near fu-

ture experiments would be conducted in New York harbor by which it was probable that fog at least two boat lengths ahead of a vessel would be electrically dissipated.

PRINCIPLE OF THE COTTRELL PROCESS

The principle of Dr. Cottrell's process may be described by means of a well-known experiment: If a metallic needle point is placed opposite a flat metallic plate and the needle is connected to one pole and the plate to the other pole of a high-voltage direct-current supply line, electricity streams out of the needle point and charges the gas molecules in the space between needle and plate. The gas molecules thus receive an electric charge of the same sign as the needle point, hence opposite to the sign of the charge of the plate. They are, therefore, attracted by the plate and move toward the plate. This is the old, familiar phenomenon of the "electric wind" which may be illustrated by blowing out a candle flame brought into the space between needle point and plate.

Now if the space between needle point and flame is filled with a gas or fume in which particles of dust, etc., are suspended, these dust particles will be immediately charged with electricity and will therefore move toward the plate, stick to it and give up their charges. The speed of movement of the particles will be proportional to their charge and to the electrostatic field intensity (in volts per centimeter) in the space between point and plate.

PRACTICAL COMMERCIAL APPLICATIONS

In his paper on the practical applications of the Cottrell system of electrical precipitation, Mr. Bradley gave many striking illustrations of dust elimination from the gases and fumes of lead and copper smelting works in various parts of the United States. The successful attempts at the Raritan Copper Works, Perth Amboy, N. J., in recovering by this process the valuable fumes from silver refinery gases after they had passed through a water scrubber were recounted as well as the removal of the chlorine gas contained in the gases from the Hooker-Chemical Company at Niagara Falls, N. Y. These and other commercial applications were illustrated by lantern slides and moving picture films, and practical demonstrations of the removal of smoke and zinc fumes were displayed on a large scale on the stage of the auditorium to the intense satisfaction of the institute.

THE PROCESS IN THE STEEL INDUSTRY

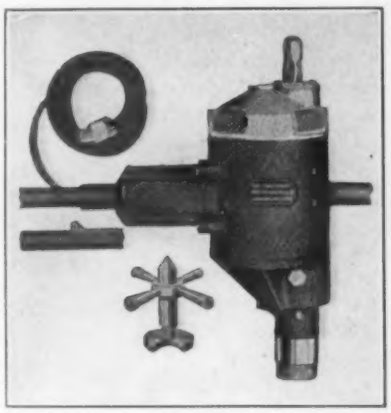
The important bearing of the Cottrell process on the steel industry was alluded to by Mr. Bradley in the following paragraph from his paper:

Owing to various reasons beyond our control, tests of the electrical processes for the cleaning of iron blast-furnace gases at the Bethlehem Steel Company were delayed. Arrangements now are being pushed so as to commence tests on a fairly large scale at the earliest possible date. It should be feasible to employ the processes either for cleaning these gases for stoves and boilers, conserving the sensible heat contained in the gases when they come from the furnace top, or for gas engine purposes, having cooled the gases previously. Perhaps both schemes will be tested at the Bethlehem plant, although the dry and hot gases will be handled first. The results are expected to have a very important influence in this field.

Canada has 29 rectangular water-jacketed copper blast furnaces, the majority of them in active operation up to the beginning of the war, according to a bulletin, "The Copper Smelting Industries of Canada," by Alfred G. Wilson, issued by the Canadian Department of Mines. Their total hearth area is 2580 sq. ft., with a total rated capacity of 15,600 net tons in 24 hr. They are controlled by seven different companies as follows: Canadian Copper Company, 6; Mond Nickel Company, 2; Consolidated Mining & Smelting Company, 5; Granby Consolidated Mining & Smelting Company (2 plants), 11; B. C. Copper Company, 3, and Tyee Copper Company, 2. Five of these seven plants have copper converters also.

Heavy-Duty Electrical Bridge Reamer

A new portable electric reamer that is especially designed for bridge and construction work of all kinds, and for use in large shops, has been developed by the Cincinnati Electrical Tool Company, Cincinnati, Ohio. A special type of slip socket and a switch of special construction form a part of the new tool. Three sizes, for reaming holes 15/16, 1-1/6 and 1-3/16 in. in diameter are built.



A Recent Design of Heavy-Duty Electrical Reamer That Has Been Developed for Bridge and Construction Work and Use in Large Shops

The motor, which is intended for use on direct current only, is of the series wound, four-pole type and is entirely inclosed. Air cooling by a fan mounted on the armature shaft is provided. The brush holders are mounted on fiber blocks and the binding posts holding the leads are designed to secure contact by compression springs. This arrangement, it is pointed out, does away with the use of nuts and screws and is relied upon to prevent the latter from loosening in service and becoming lodged in the motor. Four removable window guards give access to the brushes, thus enabling them to be replaced quickly without removing the cap or disturbing any part of the machine. The switch used is of the quick make and break type with a release lever in one of the side handles. Protection against overloads is provided.

The special type of slip socket which is used eliminates the drift key and holes in the spindle, and this arrangement is relied upon to prevent dirt and grease from lodging in the spindle. Chrome nickel steel is employed for the gears, which are fully inclosed in the lower head of the machine and are mounted on roller bearings. Grease is employed for lubrication and the chamber in which the gears are located is separated from the motor housing by a plate, thus preventing oil and grease from getting into the windings. Annular bearings are used on both ends of the armature shaft and a ball thrust bearing is employed to take care of the spindle thrust.

Pressed Steel Car Profits Less

A decline in net earnings of $1,482,465 in 1914, as compared with 1913, is shown in the annual report of the Pressed Steel Car Company, with a parallel reduction in surplus of $1,302,816. Concerning the situation, President F. N. Hoffstot said in part: "Fewer than 70,000 cars were ordered during the year from all the car manufacturers, and of this number only 1705 freight and 308 passenger cars were placed between August 1 and December 31. The company secured its proportion of the orders, but ended the year with less freight car orders on the books than in any year of its history. With the large surplus and the poor demand for existing equipment, there has been little incentive for the railroads either to buy new cars or to put bad order equipment in repair, and unless general business improves or the large trunk lines undertake to fill what are known as vacant numbers, the outlook is not promising."

TUNNEL WRECKING CRANE

Provision for Operation by Steam or Electricity the Special Feature

For use in and about the Detroit River tunnel, a combination wrecking crane, built for either steam or electric operation was supplied to the Michigan Central Railroad, by the Industrial Works, Bay City, Mich. This combination arrangement is employed so that the crane can be used for work outside of the tunnel, as well as underground if the latter should ever be necessary. The crane differs from the one supplied by this company for use in the Grand Central Terminal at New York, which was illustrated in *The Iron Age*, May 14, 1914, in that it can be operated by steam or electricity and is not a double end crane. A third rail or a flexible cable carried by the crane will supply power in the electric zone, while a system of piping provides for operation by steam from some outside source, such as an accompanying locomotive. An interesting feature of the crane is the use of an automatic cable reel for paying out and reeling in the main power cable.

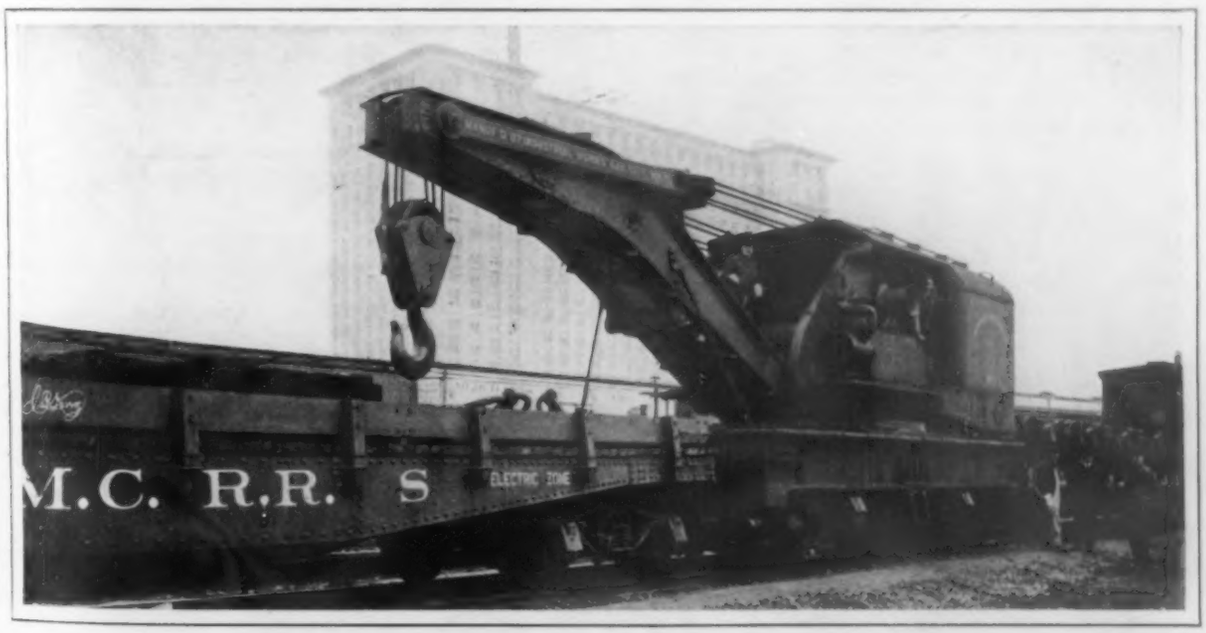
The general construction of the crane is similar to the standard 120-ton steam wrecking cranes used on American railroads. The car body is 26 ft. long and 9½ ft. wide, and the weight of the crane is distributed over a wheel base of almost 20 ft. The maximum radius of the main block is 25 ft. and the minimum is 9 ft. less. The capacity of the main hoist at right angles is 32,000 lb. at a radius of 20 ft. and 44,000 lb. at the minimum radius. The auxiliary hoist with which the crane is provided has a capacity of 24,000 lb. at a 25-ft. radius. To add stability during heavy lifting, telescoping outriggers are provided. These outriggers are located at both the sides and the end, and when all are in position the capacity of the main hoist is 240,000 lb. at a 17-ft. radius and 160,000 lb. with a radius of 20 ft. When only the end outriggers are used, the capacity of the main hoist is 140,000 lb. at a radius of 16 ft., and the auxiliary hoist has a capacity of 30,000 lb. at a 25-ft. radius. Air and hand brakes are provided, with provision for both automatic and straight air operation. The airbrake system is under the control of the operator, with engineer's valve, electric air compressor, etc.

For the electric operation of the crane a 600-volt, direct-current motor, having a capacity of 115 hp. for 1 hr. of continuous service, or 200 hp. for a short period, is provided. It will operate on voltages ranging from 300 to 700 volts, the current being taken from the third rail shoes through a collector ring. From the collector ring the current is delivered to a switchboard which contains all the necessary operating switches and instruments. The controller is of the standard street railway type.

The automatic cable reel, which is supplied for paying out and reeling in the main power cable, has a capacity for 500 ft. of insulated power cable and is operated by a motor which receives current through the cable whenever the crane is in service. Any change in the pull on the cable, such as would result from movement of the crane in either direction, results automatically in the desired paying out or reeling in of the cable, it being emphasized that the automatic control is obtained by the action of the motor alone without the use of any intermediate or external devices, such as friction clutches, etc.

Hoisting with either the main or auxiliary hoists, varying the boom radius and slewing are operations that are entirely independent of each other, but can be performed simultaneously. With the maximum rated load of 120 tons, the crane is capable of slewing at the rate of 1 r.p.m. The boom can be raised or lowered under full load, and a special drag or pulling line connection is attached to its under side. When the crane is self-propelled the speed is approximately 4 miles per hr. but when coupled in a train, it may be hauled over main line tracks at a speed of 60 miles per hr.

No boiler is furnished with the crane, and the steam required for operation is taken from an outside source through a system of piping, having a steam tight slip joint at the center of revolution, so that the crane will slew over 180 deg. in either direction. When the crane is operated by electricity the piping revolves with the crane.



A Combination Wrecking Crane Designed for Either Steam or Electric Operation

The Merchant & Evans Company has added to its lines of sheet metal products previously carried in stock at 315-317 Champlain avenue, Cleveland, Ohio, a complete assortment of sheet brass, brass rods, iron-pipe-size, brass tubing, copper rods and sheet copper. Quick shipment of all of these products in Cleveland and vicinity is thus assured.

ANOTHER SURGICAL MAGNET

Instrument at Westinghouse Works for Extracting Iron Particles from Human Body

The removal of pieces of shrapnel steel-jacketed bullets by the use of powerful electro-magnets in hospitals abroad has been acclaimed by many newspapers as the very latest application of science to surgery. It is interesting to note that the Westinghouse Electric & Mfg. Company has installed in the relief department of its East Pittsburgh works a notably powerful magnet for removing metal embedded in the flesh.

The magnet is mounted on a box containing the resistor which is used to regulate the amount of current flowing through the coils. It requires 4000 watts for its operation, or enough power to supply 100 32-candle-power Mazda lamps. It is designed for operation on 70 volts, and as the circuit from which it draws current is used for testing purposes in the works and ranges from 70 to 120 volts, a resistor is necessary.

It is not an infrequent occurrence for steel and iron workers to get bits of metal in their eyes or hands. Previous to the installation of a magnet the only means of removal was by probing, a method which is as uncertain as it is painful. Since this machine was put in operation it is a very simple proceeding to extract such particles. The portion of the body in which the foreign particle is embedded is placed near the pole tip of the magnet, the switch closed, and the magnet does the rest. The pole is removable, a number of different shapes being supplied for various classes of work.

It is very common for flying bits of metal to lodge in the eye. Should they strike with force enough to become embedded, the removal, without the aid of a powerful magnet, is likely to be difficult as well as painful. The protecting coating of the eye must be cut, and there is danger that instead of removing the particle, it may be pushed further into the eye. When the foreign body is once within the eyeball it is properly a case for the specialist.

Steel workers frequently have their hands punctured with minute pieces of metal, which become embedded under the calloused skin. If these bits are allowed to remain, the wound is likely to become infected. The use of a powerful magnet insures the removal of all traces of iron from wounds in the hand, or any other part of the body. Some remarkably small pieces have been extracted in this way, one recently recovered being not a twelfth of the thickness of a delicate needle.

Dr. C. A. Lauffer, medical director of the Westinghouse Electric & Mfg. Company, relates a number of instances in which the magnet has proved invaluable. Among these is the rather amusing case of a workman who attempted to drill one of his own teeth. The drill broke off about half an inch from the end and remained in the cavity, and it seemed as if the only way to remove the drill would be to pull the tooth. However, a special extension was made and fitted to the magnet pole. As soon as the extension was brought in contact with the drill and the current switched on, the drill was immediately drawn out.

The Electromagnet as It Would Be Used to Remove, Say, a Piece of Steel from the Eye

A Screw Driver for Inaccessible Places

The H. D. Smith & Co., Plantsville, Conn., have brought out a screw driver with three bits which can be used in the regular way, or in out-of-the-way places. As indicated in the illustration, the additional bits are placed on the sides of the blade, one extending longitudinally and the other transversely. When screws are located in places that cannot be reached by the ordinary screw driver, either of the side bits is used. The blade is 5 in. long. The screw driver is drop forged in one piece and

A Screw Driver with 3 Bits Designed for Use in Out-of-the-Way Places That Cannot Be Reached by the Ordinary Tool

the bits are ⅜ in. wide and 1/16 in. thick. The wooden handle is solid and rests against the steel, which is closed in over the wood at each end to protect it.

Elastic Limit and Yield Point of Steel

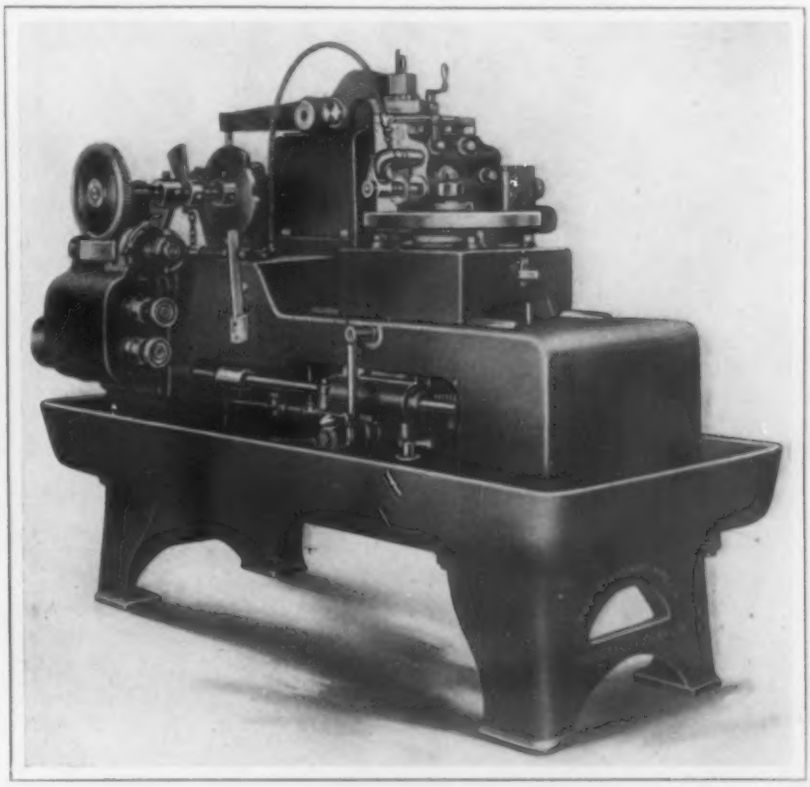
The engineering expressions, elastic limit and yield point, were termed the most abused in metallurgy by Professor Keay, of McGill University, at the November meeting of the Canadian Railway Club. The yield point is commonly considered, he said, as being approximately one-half of the tensile strength, but in experiments with the Martens or mirror type of extensometer, it has been found with ¾-in. flange steel that the true elastic limit is in general about two-thirds of the yield point. For this reason it is believed that greater care should be exercised in the use of these two terms.

The difference in the value of the elastic limit of a material when the extensometer was used and when the reading was taken by the drop of the beam was mentioned by M. D. Hayes of the Midvale Steel Company, Philadelphia. In one case the extensometer showed the elastic limit to be 49,000 lb. per sq. in., while the drop-of-the-beam method showed 61,000 lb. per sq. in. The manufacturer thus has an excessive amount of leeway unless the method of test is stipulated in the specifications. The importance of a microscopic examination of the steel's structure was also emphasized by Mr. Hayes. Such an examination furnishes data as to the way in which the steel is made and treated; while the analysis of two pieces may show the same composition the microscope will reveal whether it is of the correct structure.

Single-Belt Drive Gear Cutting Machine

The Standard Mfg. Company, Bridgeport, Conn., has recently brought out a single-belt drive type of gear cutting machine. In the construction of this machine some of the features of the company's regular line of machines, such as the raising of the cutter clear of the dial on the return stroke and the use of the micrometer adjustment to regulate the depth of the cut, have been retained.

In this new machine 8 cutter speeds and 10 rates of feed are available, being secured through gear boxes in which the change gears run in oil. The machine is adapted for dials ranging from 7 to 24 in. in diameter, and the work table for carrying the work arbor and work is adjusted longitudinally on the ways by a rack and pinion operated by a crank. In this way the work can be located in the desired position readily. By raising the cutter clear of the dial for the return stroke, it is pointed out that any passing of the cutter backward through the work is avoided, and the indexing can be done during the return stroke, this latter being accomplished through a worm and wormwheel.



A Gear Cutting Machine with a Single-Belt Drive Arranged for 8 Cutter Speeds and 10 Feeds

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At the "Made in U. S. A." exposition to be held at the Grand Central Palace, New York, March 6 to 13, space is to be reserved for exhibits among other things of automobile accessories, vehicles, household devices and equipment, mantels and grates, filters, gas devices, hardware specialties, electrical devices, etc.

Metallurgical Smoke and Its Elimination

With the idea of bringing about a better understanding between the metallurgical industry and agriculture as to the troublesome smoke problem at smelting and ore-roasting plants, the United States Bureau of Mines has just issued Bulletin 84, "Metallurgical Smoke," prepared by Charles H. Fulton, consulting metallurgist.

Owners of smelting plants are making every effort to devise ways and means to do away with possible damage and annoyance from smoke and are meeting with success. The problem is peculiarly difficult in this country because of the large tonnages of material that must be handled. The solution of the problem is not yet at hand and much experimental work still remains to be done.

In Montana, Utah and California, very large tonnages of sulphide ores are smelted with the production of great volumes of smelter smoke, comparatively rich in sulphur dioxide and other injurious constituents. It has been customary to discharge the smelter smoke by means of very tall chimneys, on the assumption that if the noxious gases are discharged at considerable hight they will have opportunity to diffuse more thoroughly and thus become so diluted as to be comparatively harmless, but the efficiency of this method is now being questioned. There is reason to believe that the use of high stacks increases the area to damage, whereas low stacks may intensify the damage but concentrate it within a smaller area. Probably high chimneys do not serve their purpose as well as was anticipated, and at present the better method may be to dilute the smelter smoke and discharge it from a number of low stacks.

Special Ingots for Horse Shoe Calks

The attention and study that is given to the production of steel ingots from which rails are to be rolled is a matter of common knowledge, but that ingots are specially made as a first step in the making of horse shoe calks is not so well known. The Rowe Calk Company, Hartford, Conn., which manufactures a self-sharpening calk, uses Mayari steel, a natural nickel-chrome alloy steel and the ingot is made to give a hard core or center and soft exterior in the billets, rods and wire subsequently rolled or drawn and in the finished calk. The Rowe calk has met with wide favor and of late some large sales for export are reported.

In casting the ingot the Pennsylvania Steel Company, Steelton, Pa., places in the ingot mold a high carbon square or round of sufficient dimensions to give a 12 per cent. hard center in the wire from which the calk is made. Around the round or square, low carbon molten steel is then poured. The ingot is rolled into 4-in. billets and then into rods and the latter drawn to wire of the size required in the making of the calks. The analysis of the steel is as follows:

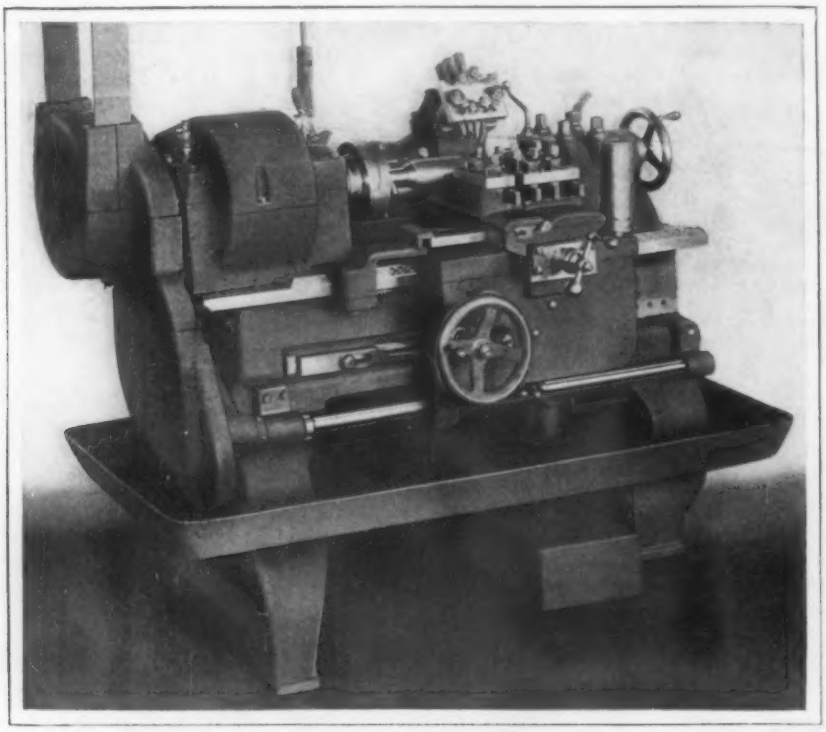
	Outside	Inside
Carbon	0.105	0.90
Manganese	0.37	0.35 to 0.45
Phosphorus	0.004	0.008
Sulphur	0.006	0.040

The wire is worked through single blow headers which form the pad, which is then taken through the following processes. First, it is pointed on special machines, then trimmed and given a square shoulder in punch presses; after trimming it is thoroughly cleaned of all burrs and threads are rolled. The calks are then put through hardeners where they are heated to a certain temperature and quenched. After being hardened the centers show over 90 on the Shore scleroscope, while the outside remains soft and tough.

The annual exhibit of evening work at Pratt Institute, Brooklyn, N. Y., will be held on Wednesday evening, March 10. Practically all of the thousand students in the evening classes are men regularly employed in their several vocations. The Institute provides instruction in industrial electricity, technical chemistry, machine design, pattern making, etc.

A 14-In. Heavy Automatic Shrapnel Lathe

A 14-in. heavy automatic lathe constitutes an essential factor in the equipment which the Reed-Prentice Company, Worcester, Mass., has designed for the fashioning of shrapnel cases. The company's methods as a whole were described in detail in *The Iron Age* of January 7. This machine plays its part both in the roughing and finishing of the projectile. In the latter operation it performs the interesting operation of radius turning in forming the nose.



A 14-In. Heavy Automatic Lathe for Rough and Finish Turning of Shrapnel Cases, One Interesting Operation Being Radius Turning in Forming the Nose

Previous to the roughing operation the shell has been centered on its closed end in a sensitive drilling machine specially equipped for the purpose with a centering device. The forging has also been cut to length. In the heavy automatic the rough piece is held by the internal expanding jaws of a chuck at the open end and by the tail center. The front tool block supports four cutting tools, which are fed into the work to the required diameter by a cam feeding-in element that controls the automatic cross slide with the travel of the carriage. An actual travel of about 2 in. is required to rough turn the full length. While the front tools are performing the diametral work the back arm is brought forward with its three or four tools—according to the design of the shell as adopted by the individual government—and forms the groove for the copper rifling band, squares down the closed end, rounds the corner and in some cases forms the small groove to receive the brass powder case, which is spun upon it. The back arm is operated by the longitudinal travel of the carriage which carries a cam that determines the feed of the back arm tools. The time required for these operations is 4 min.

The shell then goes to a turret lathe to have the diaphragm seat and powder chamber bored out, and the open end rough turned and rough squared. Another machine undercuts the groove for the copper band, and waves or knurls its bottom, to prevent the band from slipping. The shell is then heat-treated and the open end is heated again in a lead bath and closed in, to form a portion of the nose. The next process is the boring out and reaming, squaring down the open end and threading it to receive the fuse plug, which operations are performed in a turret lathe. The shell is copper banded and is then ready to go to the heavy automatic for the finishing operation. A threaded plug with driver is screwed into the open end, and the shell is placed between centers, to be given a finishing cut all over, including the radius turning of the nose. The front tool block is constructed specially for this operation. A wide bottom block, operated by the cam feeding-in attachment, carries two tool blocks, one of which is securely fastened to the bottom block and has two or three tools, as required, for the straight turning of the shell body. The second block is mounted on a dovetail of the bottom block and is actuated by a cam surface which is held stationary in relation to the bed, so that the longitudinal movement of the carriage will force the auxiliary holder into the work in whatever form the cam surface may prescribe. And the form in question is that of the radius of the nose.

The back tool block carries a forming tool the shape of which is governed by that of the copper band. This is not shown in the cut, in which the lathe is equipped for the manufacture of a special type of shrapnel.

The time required for the finishing processes is also 4 min., so that the two machines together will perform their work at the rate of 15 shrapnel an hour or 135 in a 10-hr. day, allowing the usual reduction of 10 per cent. for lost time.

An Unusually Small Foundry Cupola

An unusually small foundry cupola, constructed to avoid the great waste caused by the use of a 6000-lb. one when only small castings were required, is noted in the Journal of the American Society of Naval Engineers. The small cupola was built at the Puget Sound navy yard largely from scrap material. Its capacity is only 600 lb., and it is only about 4 ft. high from the base with an internal diameter inside the lining of 14 in. The two tuyeres are rectangular and expanding with their lower edges 10 in. from the bottom, the opening being 6½ in. wide at the broad end and about 5 in. at the narrow and 4 in. deep. The ratio of cupola area to tuyere area is about three to one. The bottom plate is a casting incorporating the spout; the cylinder is made of steel plate. The blast comes from the yard's compressed air system. It induces air in a 3-stage injector and delivers it to the cupola about 15 times its own volume. The cupola is hinged at the front to the base so that it may be turned on its side for repairs and relining and has proved entirely satisfactory.

A paint which changes color at various temperatures has recently been brought out in Europe, says F. J. Rankin of the Colorado Agricultural College. When applied to iron work it is a visual indicator of the running condition of a machine or other apparatus. The paint is red at ordinary temperatures but turns black when heated, becoming red again on cooling. It is claimed that the color will always follow the temperature, no matter how many times the cycle is repeated.

FILTERING PRODUCER GAS

Removing Sulphur From Producer Gas by Passing Through Iron Oxide Filters

BY C. A. TUPPER

The use of producer gas in the place of natural gas, increasing in some of the iron and steel districts, carries with it the necessity of guarding against the sulplur content of the gas used. Concerning the unfavorable effect upon the quality of the steel produced in the gas-fired, open-hearth furnaces, "it is perfectly clear," says a leading authority, "that some sulphur is absorbed from this gas in the steel, and much steel is injured for some purposes in the effort to reduce the sulphur. If the sulphur could be eliminated from the producer gas, it would meet the needs of the case much better than to remove the sulphur afterwards from the steel."

The object of this paper is to bring to the attention of steel manufacturers a very simple but entirely effective means of purifying producer gas which was first observed by the writer in Germany and has since been followed up in this country. The system provides, in brief, for placing, between the producers and the furnaces, a filter plant of sufficient capacity to remove all traces of sulphur. The filter boxes are built up of successive layers, on racks, of iron oxides. The material originally used abroad was bog iron, and this served the purpose, in a measure, as long as enough filtering surface was presented. But there are now available at commercial rates, both in this country and Europe, especially prepared iron oxides, known under various trade names, which are positive in their purifying action and have several times the efficiency of bog iron.

CHEAPER COAL MADE AVAILABLE

Before taking up the producers and filters, however, there is the matter of coal to be considered; and one of the most important features of the system is the fact that it enables a much less expensive grade of coal to be used for the producers.

The sulphur content of gas is naturally a percentage of the sulphur in the coal from which the gas is made. Under present conditions, therefore, the quality of the coal is of much importance to the open hearth steel manufacturer whose reheating pits and furnaces are fired with producer gas; and he must either continue to buy low-sulphur coal at a premium or else find some inexpensive means of gas purification.

In general, about 40 per cent. of the sulphur in coal passes into the gas produced from it. A long ton of ordinary Westmoreland coal of average quality makes about 10,750 cu. ft. of gas. If this coal contains 1.5 per cent. sulphur, we have, therefore, 0.6 per cent. or 13.44 lb. of sulphur leaving the producer for each ton of coal. A portion of this is taken out in the mechanical processes of washing and scrubbing, leaving say 11 lb. of sulphur, or about 720 grains per cu. ft., to pass on with the gas into the furnaces.

The great mass of this sulphur is in the form of hydrogen sulphide, H_2S. The rest consists principally of carbon bisulphide, CS_2, with some other sulphur compounds practically negligible in quantity. This is an advantage from the standpoint of purification, as the H_2S is the easiest to eliminate. It can, in fact, be removed almost completely by the simple process of passing the producer gas through a filter containing oxide of iron, which reacts with the hydrogen sulphide, so as to form sulphide of iron.

THE FILTERING MATERIALS

Among the filtering materials most successfully used is ferox, a prepared oxide, the base of which is a natural iron ore, washed and crushed. By a process of concentration this is freed from mechanical impurities, then placed in retorts. In the retorts all of the water that is in combination with the ferric oxide is driven off, together with other chemical impurities, leaving only the oxide and a certain percentage of free silica to give porousness to the mass, which is further lightened, when placed in the filter, by the addition of wood shavings. The latter also serve to catch any particles of tar that may have escaped the scrubbing and washing process. The reaction in the filter may be assisted by a special "intensifying" chemical, added as a powder, the exact nature of which is not divulged.

In putting the oxide into a purifier, the trays are first covered with a light layer of shavings, then a foot of oxide mixed with shavings is spread over the surface, stamped down and tamped hard along the edges of each tray and around each pipe inlet and outlet. A bushel of wet shavings to each 30 lb. of oxide, stirred together with a fork, is about the right mixture. Additional layers are placed in the same manner, according to the hight of the tray.

Besides the material mentioned there are filtering substances known as iron sponge, hydroxide and lavino, which have proven very efficient. To remove the sulphur from each 100 ft. of gas in ten hours requires about 1.5 to 5 cu. ft. of oxide, depending upon the sulphur content.

FILTER BOX CONSTRUCTION

There are several methods of constructing the filter boxes, particularly in providing for the entry and outlet of the gas. One is to admit the gas at the middle of one end, let it flow both up and down through the layers of oxide and out through a common orifice at the other end. This method is favored where a saving in space seems desirable. The better practice seems to be to have the gas pass one way only, and preferably down.

The gas should have a rate of flow through the filter bed of not more than 12 in. per min., and the depth of the oxide should be such that the gas will take at least 12 min. to pass through. To provide for this requires an aggregate depth of 12 ft. of oxide, arranged preferably in four layers of 4 ft. each, three in service and one cut out for regeneration or refilling. The temperature of the gas in the box should be 90 to 100 deg. F., to get the best results, particularly when starting up a filter; but in regular continuous operation the necessary reaction will ordinarily take place at any temperature down to, say, 60 deg. F.

REGENERATION

The process of regenerating the oxide is a very simple one. It merely means taking out the trays and spreading the filtering material so as to expose it to the atmosphere. This causes a second reaction, by means of which the sulphide of iron formed in the filter is converted back into oxide, the process being commonly known as "reviving" or "regenerating," and free sulphur is deposited. In this way the filtering material can be used over and over again until the percentage of sulphur becomes too high.

Reviving the oxide in the filter by means of an air blast is also practiced; or air may be drawn down through the mass. If, however, the filter boxes are rotated on the backward cycle system, the oxide can be fouled up to 60 or 70 per cent. with

only one regeneration in the open air. Reversing the direction of flow through the beds, also, has been found advantageous. In reviving by any system, precaution against fire needs to be taken, as the oxide heats rapidly and spontaneous combustion is liable to result.

Until quite recently oxides consisting of rusted borings and turnings were used almost exclusively in this country; but, as a purifying material for coal gas, manufactured by illuminating companies, these were not satisfactory, and in the case of producer gas they proxed ineffective. Hydrated iron ore, or "bog iron," utilized to some extent, is apt to become inert after the first fouling. The introduction of especially prepared anhydrous iron oxides has worked a revolution in the purification of illuminating gas; and absorption tests on producer gas show that the sulphur can be as easily removed as in gas-works practice.

Analyses of coals from different sections of the country, used for producer tests, show that a heavy sulphur content is quite likely to be accompanied by a high percentage of volatile matter and other characteristics which would mean a good gas yield. Under the conditions heretofore prevailing, such coals are shut out from consideration as fuel for producers serving open hearth furnaces; but, with iron oxide purification, there is no reason why many such cannot be used. An objection found to purifying producer gas for furnaces is the fact that it must be passed through the filter at temperatures considerably under normal, involving a loss of thermal units from cooling; but the advantages far outweigh any operating loss from this cause.

Steel and Wooden Ore Bins Compared

The many advantages of the cylindrical steel bin over the usual type of timber ore bin are set forth in an article by Percy E. Barbour, mining engineer, Bath, Me., in the Engineering and Mining Journal, extracts from which are as follows:

The data herewith presented are from four ore bins in actual service, one of steel and three of wood. The steel bin is constructed of ¼-in. plate, is 12 ft. diameter and 20 ft. high, and stands on a concrete foundation recessed for the driving gear of a plunger feeder for a set of rolls. This is mentioned to show that the foundation cost is higher than otherwise would be the case. The steel for the bin weighed 10,000 lb., and cost 3.75c. per lb. The erection of this bin, including riveting, cost $32.14 and was done by green labor. The concrete foundation required 11 yd. of concrete which cost $7.50 per yd., and the foundation bolts cost $2. Freight on the ore bin amounted to $58.23, and the total cost of the bin ready for use was $549.87.

The four bins, the steel and the 100-ton, 150-ton and 350-ton, were designed by three minds, but the cubic feet allowed per ton of ore differ little, as will be seen by the table, and they average 23 cu. ft. per ton. To prevent undue influence of these slightly differing factors the costs have been figured out both per ton and per cu. ft. of capacity. The comparisons are not altered except in degree and that only slightly.

The cost of the steel bin in the table is the actual construction cost. The costs of the wooden bins have been estimated; the timber at $30 per 1000 ft. and the labor at the same figure per 1000 ft. for framing and erecting. This was the price of timber of this size and grade at the time the steel bin was constructed, hence it gives the proper comparison. Probably this is as low as this timber can be purchased anywhere in this country today. It was found in our construction that the cost per 1000 ft. for labor for framing and erecting buildings and frame structures very nearly equaled the cost of the timber and lumber itself, which checks this way of estimating, now so commonly used. Two of these bins are tied with rods which, at 3c. per lb., increase the cost of the bin from 8 to 14c. per ton of capacity. For the purposes of this comparison that makes little difference. Nails and spikes would make a much less difference, and for this comparison may be safely omitted.

Data on the Ore Bins Considered

	Cylindrical steel bin	Usual type timber bins		
Nominal capacity, tons..	100	100	150	350
Capacity of bin, cu. ft...	2,262	2,389	3,594	7,565
Cubic feet per ton of rock allowed	22.6	23.89	23.95	21.6
Feet lumber and timber required	10,000*	13,000	23,000	47,000
Total actual cost.....	$549.87	.....	.....	.....
Total estimated cost....	.....	$794.40	$1,380.00	$2,550.30
Cost per cu. ft. capacity..	$0.243	$0.332	$0.384	$0.377
Cost per ton capacity....	$5.50	$7.94	$9.20	$8.14

*Pounds of steel for metal bin.

The table shows the cost of these bins and shows that the steel bin is the most economical as to first cost, both as per ton and per cubic feet of capacity. The 100-ton wooden bin, which is the cheapest of the three wooden ones, cost 44½ per cent. more than the steel bin. Considering the elimination of the fire risk, the absence of dead corners and the concentration of gate discharge and finally the first cost, it seems as though the steel bin has not had the common and frequent use that it deserves.

Ore-Handling Equipment Discarded

That the old type of ore-handling equipment will soon be entirely a thing of the past is indicated by the fact that the Pennsylvania Railroad is offering for sale to scrap dealers 42 rigs that comprise its entire old ore-handling equipment on Whisky Island, Cleveland. This equipment includes 30 standard one-ton rigs erected in 1889 and 12 Fast plants, built about four years later. The latter were originally equipped with one-ton buckets but later 1½-ton drag buckets were substituted. With the old type of rigs and hand-filled buckets the cost of handling ore at Lake Erie ports was about 18c. per ton. With the modern ore-handling plants this cost has been reduced to less than 25 per cent. of what it formerly was. A few months ago 22 of the old type of rigs were taken down in Ashtabula Harbor and there are but a few left along the Great Lakes. The handling equipment that is to be torn down in Cleveland has been replaced by the modern plant located along the lake front a short distance from the old rigs. This plant, which was erected about two years ago, consists of two Hulett machines equipped with 17½-ton buckets, and it is estimated that these two machines have 50 per cent. more capacity than the 42 rigs that are to be scrapped.

An Improved Two-Piece Sheet Metal Hose Clamp

To enable hose to be attached securely to a piece of pipe or a coupling, the Harrisburg Stamping Company, Harrisburg, Pa., has brought out a clamp of two pieces of sheet metal, which are stamped and afterward bent to the required radius. The special features of the clamp include a lip and ear connection for the two parts and the welding to one of the pieces of the nut employed in connection with the clamp. Lips projecting from one of the pieces extend around the hose at the junction between the two members of the clamp and are relied upon to give a full contact on the hose, thus making the joint water and gas tight. A thumb screw or a machine bolt is employed for drawing the two parts of the clamp together. It is made in eight sizes, for hose ranging from ½ to 3 in. in diameter. In using the clamp the connection is first made by slipping the hose over the pipe or coupling, after which the clamp is put on and drawn up by the thumb screw or else with a screw driver. Two of the features of the clamp on which special stress is laid are a saving in time in application and the fact that it is unnecessary to squeeze the clamp to cause the screw to catch the thread.

At the annual meeting of the Deming Company, Salem, Ohio, held recently, Walter F. Deming was elected president and W. L. Deming secretary.

British Steel Exports for January

Great Britain's iron and steel exports for January of this year show a decrease, as was to be expected, both in tonnage and values from those of January, 1914. The total sent abroad last month, excluding iron ore and scrap, was 224,628 gross tons, against 444,794 tons for January, 1914, a decrease of 220,166 tons. The falling off in values was £2,192,756, or from £4,863,659 to £2,670,903. In pig iron the decrease in exports was 59,089 tons, the total for January, 1915, being 17,345 tons, against 76,434 tons in the same month in 1914. In steel bars an increase of 9378 tons is reported for January last, the total exports being 30,226 tons against 20,848 tons for January, 1914, this being the only instance of an increase in exports for any one item. The exports of galvanized sheets were 27,988 tons, or 49,439 tons less than for January, 1914, which were 77,427 tons.

Exports of ferromanganese last month were about 3800 gross tons, as compared with about 5700 tons in January, 1914, most of this going to France, Italy and Sweden and none to this country. Imports of manganese ore last month were 39,413 tons, against 60,683 tons in January, 1914, a decrease of 21,270 tons.

Imports of iron and steel, excluding iron ore and scrap, last January were 68,880 gross tons, against 181,249 tons for January, 1914, a decrease of 112,369 tons. The values for these two months were £1,221,040 and £580,302, respectively, a decrease in imports of £640,738. Imports of iron ore for January, 1915, were 365,812 gross tons, compared with 528,325 tons in January, 1914.

Exposition Opening Day, San Francisco

The Panama-Pacific Exposition opened its gates at noon, Saturday, February 20. It is estimated that more than 300,000 people joined in the inaugural ceremonies with which the day was celebrated and surged through the exhibits. The opening signal was received from President Wilson at Washington, and at San Francisco the President was represented by Franklin K. Lane, Secretary of the Interior. The exposition comprises eleven principal exhibit divisions, which, with the courts, statuary, paintings and general features of the exposition, represent a cost of more than $300,000,000. In the metal and mining industries the progress of the arts is shown, very largely in model reproductions of mines, mills and equipment, and despite the European situation the presentation of foreign exhibits falls little, if any, short of what it might otherwise have been. The exposition will be notable for the number of meetings of societies and trade organizations to be held at San Francisco during the year, many of them of international character. It is noteworthy, also, that through the disappointment that must have come with the turmoil of European affairs, San Francisco has again risen to the accomplishment of a tremendous undertaking, as it did from its own ashes to the building of a greater city.

The Mulliner-Enlund Company

The Mulliner-Enlund Company, recently incorporated, has leased an entire floor of 5000 sq. ft. at 541 South Clinton street, Syracuse, N. Y., located in the heart of the city and especially favored with railroad service. The company designs and builds special machinery, models, drill-jigs, and punches and dies. Richard Mulliner has had several years' experience in the designing and building of tool dies and commercial machine models, having been associated with Arthur J. Briggs, of the Union Typewriter Company, an expert in this line. He was also a tool-die maker before he became a designer, and was technically educated at the Pratt Institute, Brooklyn, N. Y. He was associated with Mr. Briggs in developing the Vannetta bobbinless sewing machine, having also brought out the model type Hi-Planer now made by the E. N. Green Company, Syracuse. Gustaf N. Enlund is an expert model maker and die specialist, with several years' experience in general die and tool work. The plant is now running 12 hr. per day on present orders.

German Iron and Metal Trades

The situation in finished iron and steel in Westphalia has decidedly strengthened and prices are generally advancing.

The Pig Iron Syndicate discontinued February 1 its export bounty of $1.15 on material used in the production of exported products. The home demand for hematite and No. 1 foundry iron as well as good Siegerland brands is strong, but Luxemburg brands are quiet. Stocks of hematite and No. 1 foundry are rapidly diminishing because of demand for war purposes and augmented production beyond the present is not expected. Much depends on the ore output. The lack of skilled miners is marked and the training of green men is rendered very difficult by the fact that they prefer lighter labor and can get it. This labor scarcity is affecting both the Rhenish-Westphalian industries and the Lorraine mines. It is stated that if all the Landstrum men are called out it will be impossible to keep the works going at the present rate of output. The importation of ore from Sweden is very difficult and expensive.

Contracts for Luxemburg pig iron for export are being made. This brand of foundry iron is $15.94 to $16.42 at Luxemburg; spiegeleisen is $20.44; special forge pig is $17.27 and steel-making iron $18 to $18.25 at Siegen. Hematite iron is $22.63; No. 1 foundry, $19.34, and No. 3 foundry, $18.12 in Westphalia.

Domestic quotations for steel ingots are $21.90; for roughed-down ingots, $23.12; for billets, $24.94; for basic sheet bars, $25.55. Slabs for export are $22.39 and billets $23.36 to $23.60.

Steel bars are now $27.37, compared with $24.82 to $25.06 at the close of 1914. Makers are holding out for higher prices and demand has expanded. Steel bars for export are also $27.37. Iron bars are $34.79 within a limited area in Westphalia, the export price being $32.85 and lower. The Hoop Iron Association has advanced prices $1.22, to $30.42. Demand for shapes has increased, the syndicate price being $26.76 and the export $26.28 f.o.b.

Plates have bettered in demand and production, and quotations now stand at $26.76 to $29.20 for common plates, with structural varieties at $29.81 and boiler plates at $31.63. Medium plates are $28.47 and light ones $31.63, the latter exporting at $29.20. Wire rods, owing to close competition, are now $24.33 to $25.55 for basic and $26.03 for open-hearth. Drawn wire and wire nails have also fallen. Large export orders for heavy railroad structural material have been booked at $27.98 to $30.17. Extensive improvements in the tube market have led to a reduction of about 2 per cent. in makers' discounts, nearly all stocks having been reduced. Present rate of improvement is expected to restore production to what it was before the war.

The iron-ore mines of the Monceau-Saint Fiacre Company, a Belgian firm at Oettingen near Ruemelingen in Germany, idle for some time, have been sequestered and exploited by the German military authorities.

The Becker Steel Works has bought an adjoining plant for about $55,000 to extend its capacity.

The Association of German Galvanized Sheet Makers has raised prices $4.87 per ton, to $148.92, to merchants delivered at Oberhausen and from $163.02 to $175.19 to consumers.

A new company, the Vereinigte Blei und Zimiwerke, has been founded at Cologne for rolling and pressing lead and tin and making lead and tin alloys. It is independent of the German Lead Syndicate and its capital is about $800,000.

The Association of Berlin Metal Merchants has petitioned the committee of the Berlin Metal Exchange for the introduction of official exchange quotations for spelter, lead, aluminum and antimony so that when normal conditions again obtain business in these articles may be officially recognized.

The Huntington Machine & Foundry Company, Huntington, Ind., has just placed an order for a large boring mill, lathes and keyseater, all of heavy type, to handle its increased business. It has added bridge operating machinery to the lines of its manufacture.

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Steel Demand in War Time

The course of the iron and steel trade throughout the war emphasizes the fact that its products are used chiefly for permanent construction, work in which capital is invested with the expectation of continuous return in earnings in the future. France, Germany and Belgium furnished approximately one-half the iron and steel consumed by countries that do not produce. Since the war began, exports from these countries have been practically nil, yet the export trade of both the United Kingdom and the United States has suffered. Iron and steel exports of the United States in the first five months of the war were 18 per cent. less than in the preceding five months, and 52 per cent. less than the average rate in 1912, the banner export year. British exports in January, just reported, were 230,204 tons, making 1,387,919 tons for six months of the war, or 40 per cent. less than in the preceding six months. Physically, the British exports were larger than reported, because war munitions sent to the continent are not included. In the United States exports, however, there are war materials, also material exported to England that would not ordinarily go thither, so that American exports to neutral countries have decreased more than the 18 per cent. shown by comparisons of totals.

It may be estimated roughly, therefore, that the iron and steel demand of neutral and non-producing countries has been only about one-fourth as great since the war began as formerly. This decrease of three-fourths has not been due to the common everyday activities of the peoples of those countries having been diminished in any such proportion; it is because they are not in position to make permanent investments in facilities that represent the locking up of capital in expectation of future earnings therefrom.

It has lately become quite evident that the demand for iron and steel for war purposes will fall far short of the expectations obtaining in some quarters a few months ago. For instance, our barb wire exports reached a maximum in November, 17,791 tons, and then fell off by more than one-half in December, to 8306 tons. There may be increases in this and other items in the future, but there has now been enough experience of war conditions to indicate the extreme improbability of the war demand bringing our exports up to the best record in peace times, seeing that our exports just before the war were at only 60 per cent. of the best rate formerly attained.

It is impossible for the demand for ships to develop a consumption of steel sufficient to make a marked impress on the American steel situation. Steel orders for shipbuilding look large individually, but a vessel is a long time in building. The steel production of the United States in a single year, if converted into the proper form, would probably furnish more steel than would be required to replace the world's merchant marine in steel ships.

What the iron and steel trade of the United States must look forward to, then, is the establishment of such conditions of confidence on the part of investors as to lead to capital investments predicated upon earnings to be returned in the busy times that will follow the restoration of peace. In that direction there are almost unlimited possibilities. While the buying power of the world in the ordinary necessities and luxuries of life will be impaired for many years, the returns upon an investment involving the consumption of iron and steel are not for one year but for many years, and thus a revival in permanent construction, particularly in the United States, may come quickly, for it does not need to await the end of the war. It is by reason of this principle that the iron market earned for itself the title "barometer of trade," because the investment of capital involving outlays for iron and steel anticipates the demand for products or services contemplated by the investment.

Dormant Strength in Machinery Design

The machine tool business of the United States has been so dull until recent months that builders have been slow to spend money to bring out new types and improvements on existing models. They have wished to conserve their financial resources. The requirements of the war have caused quick adaptation of machinery to special purposes, but the normal improvement and enlargement of lines of machine tools are only just beginning after a period of suppression. Neither the manufacturers nor the designers have been idle. Instead dormant power has been accumulating which will accentuate still further the position of American machinery in the front rank. Important improvements may be looked for in many shops from now on. Some of those already on paper are known to be of unusual value.

Meanwhile, it is pointed out, European machinery builders can make little advance. Their designers are fighting with their regiments or are concentrating their efforts on problems having to do

with war supplies. It is no time with them for the creation of better designs for fashioning metal well and cheaply. Europe had been catching up with the United States in the machine tool market. Much of the best in American design was copied with greater or less success, and, of course, the advantage in cost of production has commonly been against us. The war will permit American designers again to take a long lead. When European manufacturers begin to buy again for peaceful pursuits, they will give to the latest models from the United States a preference greater than has been the case for some years. Machinery builders abroad are of course learning much that will be of value in future practice of intensive manufacture, but so, too, are American machine tool builders profiting in experience by the urgent demands on them in fashioning shells and equipping gunshops and cartridge factories. The sum total of knowledge of machine design and practice is taking a long step upward, especially in the United States.

The Character of Our Exports

The favorable balance in our foreign merchandise trade was $130,976,013 in December and $145,563,103 in January. These are altogether unprecedented balances. It is common to ascribe them in large part to an increase in our exports, particularly of foodstuffs, but in considerable part also to a decrease in imports. With a short range view, the latter part of the analysis is correct, for our imports have been decreasing since the war, but it is not altogether certain that the very large import movement occurring in recent years has become a permanent institution, at least with a tariff calculated to protect the economic position of the country. When we had an adverse trade balance month by month from April to August inclusive of last year, the imports were running at an average rate of $150,000,000 to $160,000,000 a month, while they dropped to $114,656,545 in December.

To trace rapidly the course of our import trade, it may be mentioned that not until March, 1871, did our merchandise imports ever reach $50,000,000 in a month; the $100,000,000 mark was not reached until April, 1897, and $150,000,000 was not attained until March, 1912. A monthly average, during a calendar year, of $50,000,000 was not reached until 1872; an average of $100,000,000 not until 1906, and an average of $150,000,000 not until 1912. Bearing in mind the state of trade in the years which signalized these events, one seems rather justified in drawing the conclusion that we increased our imports simply because we could afford to do so; we needed certain things for our industries and could afford certain other things as luxuries.

It seems too soon to conclude that we have attained a permanent rate of importing at $150,000,000 a month. Indeed, it would appear that the framers of the tariff of October, 1913, have lately become painfully aware of that fact, the tariff law having fallen far short of producing the computed revenues. Had the rates been based upon a more extensive presentation of imports than the experience of the then recent past, they would doubtless have been somewhat higher. Imports for the first five months of the war averaged $130,000,000 a month, but it was not until 1910 that such an average rate was ever reached.

In the circumstances it seems fair to ascribe nearly all the credit of our large favorable balance of trade to the magnitude of the exports now being made. The December exports were the highest on record, with the exception of the last three months of 1912 and the single month of October, 1913. The exports of foodstuffs did not preponderate so tremendously as is sometimes assumed. Comparing the figures for the month with the average of the three Decembers preceding, crude foodstuffs increased $39,000,000; foodstuffs partly or wholly manufactured increased $7,000,000; crude materials for manufacturing decreased $40,000,000; partly manufactured goods decreased $2,000,000 and manufactures ready for consumption decreased $3,000,000, while "miscellaneous" rose from less than a million to over $9,000,000. The percentage of the total exports comprised in foodstuffs crude or manufactured was 37 per cent. last December, against 18 per cent. the three preceding Decembers. Our exports are still preponderatingly in crude, partly manufactured and manufactured materials other than foodstuffs. An important bearing of this fact is that there is no reason for expecting any large decrease in our exports, as the season for moving the cereal crops is passed.

Our iron and steel exports, including most lines of machinery, have averaged $14,000,000 per month since the war started, against $19,000,000 a month in the first seven months of 1914 and an average of $24,000,000 a month in 1912 and 1913, the two biggest years. Agricultural implement exports, however, which are not included as iron and steel, decreased from $11,921,000 in the last five months of 1913 to $2,378,000 in the last five months of 1914, the first five months of the war.

The Machine-Tool Situation

General Manager Charles E. Hildreth, of the National Machine Tool Builders' Association, has just returned from a trip in which he visited in their works a representative list of the members, especially in some of the important centers of the Middle West. He thus came into intimate touch with conditions as they have developed since the first of the year. He found a practically unanimous belief that the machine-tool business is on the upward trend, as indicated both by increasing orders and a growing volume of inquiries, in which purposes other than those traceable to the war are much more strongly in evidence than at any time since hostilities began.

The hopeful sentiment is based also on other influences. Manufacturers are keeping more closely in touch with general national and world conditions than formerly, and are basing their judgments on broader grounds. Today they feel that the improving condition of the iron and steel market is most encouraging, and especially gratified are they by the investing public's attitude toward the railroads, as indicated by the ready sale of the Pennsylvania and New York Central securities, for if the railroads are enabled to take care of their recurring liabilities in this manner the sooner will they be able to enter the market for the machinery which is sadly needed for their repair shops.

All builders of machinery used in the manufacture of war materials are very busy, including makers of lathes, the automatics and semi-automatics and the grinding machines. Some boring mills of the smaller sizes are being sold for the same purpose, together with large numbers of sensitive drilling machines and a few upright drilling machines. Planers, radials and shapers are in less demand. Generally speaking, builders of very heavy machinery of all types are least busy of all. Mr. Hildreth noted a tendency among machine-tool manufacturers to take on outside work, much of it foreign to the industry, but for which the shops are suitably equipped.

The universal opinion expressed to Mr. Hildreth by the members of his association is that the improvement will be gradual and healthful. When the railroads begin to absorb heavy machinery in large amounts the influence will be decidedly stimulating to not a few manufacturers. When the Machine Tool Builders meet in their spring convention at Atlantic City, May 20 and 21, the probability is that the atmosphere will be one of cheerfulness.

Early Cast Iron

"The Origin and Development of the Foundry Cupola" was the subject of a recent lecture before the Ipswich Engineering Society of England by Robert Buchanan, of Birmingham, in which he stated that he owned what he thought was the oldest piece of cast iron in the world. It is a portion of a gully grate from the floor of some ruins at Ephesus and still shows the crystals of iron. The lecturer stated that the first recorded use of cast iron was in 1543 when a man named Hogg made cannon in Sussex. He believed however that it must have been first made earlier than this since in 1595 cannon weighing 6000 lb. were reported as having been made and he did not think such progress possible in 50 years. The first recorded cooking pot of cast iron was 160 years after cannons were cast, indicating that armaments were then in the lead in the metallurgy of iron as in a great degree so at present.

Alton Steel Company to Resume

The statement is made, following a conference at Alton, Ill., between H. C. Fownes, Jr., the largest bondholder, George Orr of Alton and J. V. E. Marsh, attorney for the Alton Steel Company, that the bondholders will take over the plant of that company and proceed to the resumption of operations. It is stated, further, that the plant will be remodeled and equipped for a wider range of product at a cost of $150,000. The Alton Steel Company was placed in receiver's hands in July, 1914, and the plant has been idle continuously since. It is hoped operations will begin again by May 1.

Approaching Conventions

The National Metal Trades Association will hold its Spring meeting at the Hotel Astor, New York City, April 12 to 15, inclusive, beginning with the meeeing of the Executive Committee on the afternoon of the first day. The convention sessions will convene on Wednesday morning.

The spring convention of the National Tool Builders' Association will be held at the Marlborough-Blenheim Hotel, Atlantic City, N. J., May 20 and 21.

The Minnesota Tax Commission, by Rukard Hurd, secretary, has just issued, in pamphlet form, chapters VI and VII of its fourth biennial report. These chapters cover the subject of "Mines and Minerals" in Minnesota and deal with the general extent, value, assessment and taxation of iron ore in that state. The pamphlet presents much information of value to the trade.

SHEET-MILL WAGE QUESTION

The Unsettled Situation in the Sheet and Tin-Plate Mills

The referendum vote taken recently by the Amalgamated Association among employees in the sheet and tin-plate mills that sign the Amalgamated scale, which vote resulted in a refusal to accept the proposed reductions in sheet and tin-mill labor wage scales, has brought about a very unsettled condition among these mills. It develops that the men employed in the sheet mills of the Whitaker-Glessner Company at Martins Ferry, Ohio; the National Enameling & Stamping Company, Granite City, Ill., and the Youngstown Iron & Steel Company, Youngstown, Ohio, voted in favor of accepting the reduction, while the men employed in the sheet mills of the Whitaker-Glessner Company, Wheeling, W. Va.; the Brier Hill Steel Company's two sheet mills at Niles, Ohio; the Newport Rolling Mill Company, Newport, Ky.; the American Rolling Mill Company, Middletown, Ohio; the Deforest Sheet & Tin Plate Company, Niles, Ohio; the Follansbee Brothers Company, Follansbee, W. Va.; the Carnahan Sheet & Tin Plate Company, Canton, Ohio, and the Trumbull Steel Company, Warren, Ohio, voted against accepting the reduction.

The result of this is that both the sheet mills of the Brier Hill Steel Company at Niles are down, but the company states this is for lack of orders on which to run. This week the Youngstown Iron & Steel Company is operating eight out of nine sheet mills, and while the men voted to accept the reduction the company is still paying the Amalgamated scale rates, but does not know how long it will do so. The Whitaker-Glessner Company is operating both of its sheet mills this week at the scale rates.

A meeting of the sheet-mill owners that sign the Amalgamated scale was held in Pittsburgh on Friday, February 19, to consider the situation, but nothing definite was done and the next move to be made is not known at this time. However, it is intimated that some of them, especially those having plants where the men voted to accept the reduction, may declare the mills open in a short time and will run on a non-union basis.

The referendum vote showed that 467 men in the sheet mills agreed to accept the reduction, but 1045 were against it. In the tin-plate mills the vote was nearly even, 295 voting to accept the reduction and 353 to reject it. The Amalgamated Association officials claim that, if the sheet-mill owners insist on the reduction in wages, it will be a violation of contract and may possibly be carried to the courts. This was done a good many years ago under a similar condition that exists now, but the case was non-suited. In the meantime, prices on blue annealed, black and galvanized sheets are firmer, the expectation being that possibly other mills may close down in the near future until the wage dispute is settled.

Conference on Russian Trade

An international trade conference is to be held under the auspices of the Russian Chamber of Commerce at the Biltmore Hotel, New York City, on the evening of March 12. A plan for winning foreign trade, especially that of Russia, is to be presented for discussion. The object of the conference is to show exact conditions and trade possibilities in Europe and Asia, and especially in Russia, and to set forth the most effective policies and methods. It is stated that the conference will be limited to 50 participants with admission strictly by card. Ivan Narodny, 141 Broadway, New York, is managing director of the executive committee in charge of the conference.

At the recent annual meeting of the National Sanitary Company, Salem, Ohio, Fred H. Snyder was elected president; Jacob F. Snyder vice-president, and Richard Johnston treasurer and general manager. The plant is now controlled by Massillon, Ohio, interests and there is talk of moving it to that city.

SPECIAL CONGRESS SESSION

Condition of the Federal Treasury Likely to Need Attention in Spring

WASHINGTON, D. C., February 23, 1915.—There are influential members of the majority party in both houses of Congress who are convinced that serious blunders, from both an industrial and a revenue standpoint, were made in the framing of the existing tariff schedules and that if these mistakes are not corrected, or their early correction pledged to the people, the next Presidential and Congressional campaign will be fought with the tariff as the paramount issue and with but slight prospect for the success of the party now in power. In fact, the condition of the treasury has recently become so disturbing to the leaders in Congress responsible for revenue legislation that the feeling is daily strengthening that a special session of Congress the coming spring, to consider ways and means to provide for the support of the government, is inevitable, quite regardless of the disposition that may be made of the ship purchase measure or the great annual appropriation bills.

While the Administration is engaged in the laudable effort of preventing the spread of alarming reports with regard to the revenue needs of the treasury, the real conditions in that department are giving the majority leaders in Congress grave concern. On January 1 of the present year there was recorded a deficit of $62,000,000. Assurances were then given out by the department that this shortage would be rapidly reduced as the result of the operation of the war revenue emergency act, which was estimated to produce $80,000,000 per annum, or about $6,500,000 per month. If this estimate had been realized the deficit at this date would have dwindled to about $50,000,000, instead of which it has increased to $82,000,000 in round numbers, a difference of more than $30,000,000. The utter failure of the revenue act to justify the estimates made when it was passed is now frankly conceded. It has been in full operation for the equivalent of three calendar months and should have produced nearly $20,000,000, but the records show that the internal revenue collections to date are but $6,500,000 greater than on the corresponding date a year ago. Administration officials declare that the prohibition movement has cut into the internal revenue collections.

Customs revenues to date are nearly $60,000,000 behind the total of the same date a year ago. The emergency act goes off the statute books automatically January 1 next and sugar passes to the free list 4 months later. These two items, it is estimated, are now producing $80,000,000 and $45,000,000 respectively, or a total of $125,000,000. On their face these figures would show, on the basis of the present deficit and the further loss of the emergency taxes and the sugar duty for eight months, the unprecedented deficit of $150,000,000.

It is an open secret here that the majority leaders are seriously considering the repeal of that provision of the Underwood-Simmons act placing sugar on the free list and it is regarded as practically certain that the war revenue act will be extended for another year from January 1 next. Bills for both these purposes have been introduced by Democratic representatives, but if they are not acted upon at a special session, it is difficult to see how they can be passed in time to be effective. Even a joint resolution in the simplest form, dealing with any phase of the revenue question, could hardly be passed after Congress meets next December and before the date of the repeal of the emergency act on January 1 following, and it goes without saying that any attempt to revise the exisiting tariff law by restoring sugar to the dutiable list would open up a discussion that would hardly be terminated before the dates set for the national presidential conventions. Under the circumstances, therefore, indications all point to an extra session this coming spring or summer unless the Administration is willing to resort to the device, of very doubtful wisdom, of floating a bond issue, the terms of which, under existing law and in view of present business conditions, would hardly prove attractive to either speculator or investor. W. L. C.

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Chinese Antimony in the United States

The bulk of the annual purchase of the United States of 15,000,000 lb. of antimony comes from China according to Commerce Reports. Of the importation of 14,263,629 lb. of antimony in 1914, valued at $696,362, China furnished 4,300,892 lb., valued at $190,737. A Chinese mining and smelting company has opened a New York office for the direct sale in this country, England being credited, in the United States custom returns, as furnishing nearly half of the imports, but most of it coming from China. Imports in 1913 were 19,584,624 lb. valued at $1,134,467, of which China furnished 6,909,995 lb. valued at $286,455.

The Compressed Gas Manufacturers' Association is desirous of securing catalogues, price lists and full descriptive details of valves, cylinders, recording gauges, filling and weighing stands and the material and appliances which enter into the manufacture, transportation and sale of compressed gases. This information should be sent to John J. O'Rorke, secretary of the association, 25 Madison avenue, New York City.

The Cyclone Drill Company, Orrville, Ohio, has been sold to a new company of which R. R. Sanderson is president and its name has been changed to the Sanderson Cyclone Drill Company.

The Iron and Metal Markets

MILL OPERATIONS HIGHER

Spelter Still a Dominating Factor

Hoops, Wire Fencing and Galvanized Sheets Up —Structural Market Brighter

February is enjoying a heavier daily percentage of specification on contracts than did January, a condition reflected in the higher rate of operations of the steel mills, and March will be materially helped by the fruition of contracts of quite some volume on which figuring has been going on this month. There are numerous negative influences which tend to chill the enthusiasm for the immediate future, but confidence in continued steady, if slight, improvement persists. Nothing has happened to shed light on how well March advances for finished steel will be held, but it is to be remembered that the bulk of the normal consumption is under contract and will not be pressing the market.

The Carnegie Steel Company is operating at 65 per cent. capacity, other steel companies between 50 and 60 per cent. and independent tin-plate makers from 75 to nearly 100 per cent. The increased active operations are further indicated by the putting in blast of three more stacks of the Steel Corporation.

Spelter is again a dominating factor. Galvanized sheets are up $3 a ton over last week, or $8 advance in two weeks, to the highest figure for years. To add to the uncertainties, the operation of some the unionized sheet and tin-plate mills is checked temporarily at least until employer and employee come to an understanding regarding the proposed wage reduction. With spelter more than 75 per cent. higher than it averaged in 1913 and 1914 and demand for galvanized sheets running recently 65 per cent. and over of mill capacity, stocks are probably none too large. It is not surprising that makers refuse to sell at present prices for future shipment.

While railroads are still slow in deciding on bridge work and car builders have inquiry now for not more than 2400 cars, both freight and passenger, to encourage them, some rail purchases are to be noted, including 8000 tons for the Soo Line, 6000 tons for the Southern, placed with the Tennessee Coal, Iron & Railroad Company, and 5000 tons for the Baltimore & Ohio placed with the Illinois Steel Company. It is estimated that 15,000 tons girder rails have been sold in the last two or three weeks. China is asking for 9000 tons of rails.

High ocean insurance accentuated by delays in English ports for unloading do not help an export situation harassed by high freights, scarcity of boats and blockade-zone uncertainties. Fresh round lots of rails, wire rods, skelp and barb wire have been sold for shipment to belligerent countries and inquiry is active for steel for shrapnel shells and wire, with sales of the latter for deliveries up to July.

The beginning of work on the Memphis bridge, taking 16,000 tons, the imminence of an award in the Indianapolis grade elimination work, involving 19,000 tons, the probably early decision on 20,500 tons for widening elevated railroads in Brooklyn, together with other large structural work now active, including 9600 tons for the Portland, Ore., bridge, 9400 for a viaduct in Cleveland, 5000 tons for the Pennsylvania railroad, 3000 tons for pier work at Savannah, Ga., total close to 100,000 tons, most of which ought to count in March bookings.

Plates and structural shapes totaling over 15,500 tons will be required for the battleship California, on which bids were taken last week. With additional buying of merchant ships on the Atlantic seaboard and two sister ships to the California to be built, not to mention the provisions of the Navy appropriation bill now in Congress, steel consumption of the shipyards will be high for months.

Domestic movements of pig iron are without moment and the export business is largely without definite confirmation. Such is the case of 40,000 tons of Southern iron for Italy.

The new freight rates are inexplicable except to traffic experts. Both sellers and buyers are accepting the increased figures, noting that the rates, say, from Pittsburgh to New York are over 5½ per cent. higher than formerly on finished steel and to Philadelphia 6 per cent. and over.

The ferromanganese situation has been relieved only to the extent that negotiations are under way to let out of England an amount which would correspond to about a month's import need at the present rate of operations.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	Feb. 24, 1915.	Feb. 17, 1915.	Jan. 27, 1915.	Feb. 25, 1914.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia....	$14.25	$14.25	$14.25	$15.00
No. 2, Valley furnace....	13.00	13.00	13.00	13.25
No. 2 Southern, Cin'ti...	12.40	12.40	12.40	14.00
No. 2, Birmingham, Ala..	9.50	9.50	9.50	10.75
No. 2, furnace, Chicago*.	13.00	13.00	13.00	14.25
Basic, del'd, eastern Pa..	13.50	13.50	13.50	14.25
Basic, Valley furnace....	12.50	12.50	12.50	13.25
Bessemer, Pittsburgh ...	14.55	14.55	14.55	15.15
Malleable Bess., Ch'go*..	13.00	13.00	13.00	14.00
Gray forge, Pittsburgh..	13.45	13.25	13.45	13.65
L. S. charcoal, Chicago..	15.75	15.75	15.75	15.25
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh..	19.50	19.50	19.50	21.00
O.-h. billets, Pittsburgh..	19.50	19.50	19.50	21.00
O.-h. sheet bars, P'gh...	20.50	20.50	20.50	22.00
Forging billets, base, P'gh	24.00	24.00	24.00	25.00
O.-h. billets, Phila.....	**21.52**	21.40	21.40	23.40
Wire rods, Pittsburgh...	25.00	25.00	25.00	26.50
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	11.75	11.75	11.50	13.25
Iron rails, Philadelphia..	13.00	13.00	13.00	16.50
Carwheels, Chicago.....	10.00	10.00	10.00	12.25
Carwheels, Philadelphia.	**11.00**	10.50	11.00	12.75
Heavy steel scrap, P'gh.	11.75	11.75	11.50	12.75
Heavy steel scrap, Phila.	10.00	10.00	10.00	11.00
Heavy steel scrap, Ch'go.	9.75	9.75	9.25	10.25
No. 1 cast, Pittsburgh...	11.25	11.25	11.25	12.00
No. 1 cast, Philadelphia.	12.00	12.00	12.00	13.00
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.00	10.75
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	1.80	1.80	1.80	1.95
Galv. sheets, No. 28, P'gh	**3.40**	3.25	2.90	2.95
Wire nails, Pittsburgh...	1.60	1.60	1.55	1.60
Cut nails, Pittsburgh....	1.55	1.55	1.50	1.65
Fence wire, base, P'gh..	1.40	1.40	1.35	1.40
Barb wire, galv., P'gh...	2.00	2.00	1.95	2.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel, Per Lb. to Large Buyers:	Feb. 24, 1915. Cents.	Feb. 17, 1915. Cents.	Jan. 27, 1915. Cents.	Feb. 25, 1914. Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.20	1.20	1.20	1.27½
Iron bars, Pittsburgh	1.10	1.10	1.10	1.40
Iron bars, Chicago	1.10	1.07½	1.00	1.12½
Steel bars, Pittsburgh	1.10	1.10	1.10	1.20
Steel bars, New York	1.269	1.26	1.26	1.36
Tank plates, Pittsburgh	1.10	1.10	1.10	1.20
Tank plates, New York	1.269	1.26	1.26	1.36
Beams, etc., Pittsburgh	1.10	1.10	1.10	1.20
Beams, etc., New York	1.269	1.26	1.26	1.36
Skelp, grooved steel, P'gh	1.10	1.10	1.10	1.25
Skelp, sheared steel, P'gh	1.15	1.15	1.15	1.35
Steel hoops, Pittsburgh	1.25	1.20	1.20	1.30
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$1.50	$1.50	$1.50	$1.85
Furnace coke, future	1.65	1.65	1.65	2.00
Foundry coke, prompt	2.00	2.00	2.00	2.50
Foundry coke, future	2.15	2.15	2.15	2.75
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	15.25	15.25	14.62½	15.00
Electrolytic copper, N. Y.	14.62½	14.62½	14.37½	14.50
Spelter, St. Louis	9.35	8.75	7.30	5.20
Spelter, New York	9.50	9.00	7.50	5.35
Lead, St. Louis	3.77½	3.72½	3.52½	3.87½
Lead, New York	3.85	3.85	3.70	4.00
Tin, New York	38.00	36.12½	35.50	38.12½
Antimony, Hallett's, N. Y.	19.00	18.50	17.00	7.00
Tin plate, 100-lb. box, P'gh.	$3.10	$3.10	$3.10	$3.30

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in. inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.10c.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.40; galvanized, $1.80. Galvanized barb wire and fence staples to jobbers, $2; painted, $1.60. Wire nails to jobbers, $1.60. Woven wire fencing, 73 per cent. off list for carloads; 72 off for 1000-rod lots; 71 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized	1.90	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Wire Rods.—Bessemer, open-hearth and chain rods, $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from February 11, 1915, and iron pipe from February 12, 1915, all full weight.

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	66	47
½	77	65½	⅜	65	44
¾ to 3	80	69½	½	69	54
			¾ to 2½	72	59

Lap Weld

2	77	66½	1¼	56	43
2½ to 6	79	68½	1½	67	54
7 to 12	77	66½	2	68	56
13 and 14	63½	..	2½ to 4	70	59
15	61	..	4½ to 6	70	59
			7 to 12	68	58

Reamed and Drifted

1 to 3, butt	78	67½	1 to 1½, butt	70	57
2, lap	75	64½	2, butt	70	57
2½ to 6, lap	77	66½	1¼, lap	54	41
			1½, lap	65	52
			2, lap	66	54
			2½ to 4, lap	68	57

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	68	55½	⅜	63	50
½	73	64½	½	67	58
¾ to 1½	77	68½	¾ to 1½	71	60
2 to 3	78	69½	2 and 2½	72	61

Lap Weld, extra strong, plain ends

2	74	63½	1½	65	55
2½ to 4	76	65½	2	66	57
4½ to 6	75	64½	2½ to 4	70	59
7 to 8	69	58½	4½ to 6	69	58
9 to 12	64	53½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	63	54½	½	57	47
¾ to 1½	66	57½	¾ to 1½	60	50
2 to 2½	68	59½	2 and 2½	62	52

Lap Weld, double extra strong, plain ends

2	64	55½	2	58	47
2½ to 4	66	57½	2½ to 4	60	52
4½ to 6	65	56½	4½ to 6	59	51
7 to 8	59	48½	7 to 8	52	42

To the large jobbing trade an additional 5 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	62	1½ in.	45
2¼ in.	59	1⅝ and 2 in.	49
2½ and 2¾ in.	65	2¼ in.	45
3 and 3¼ in.	70	2½ and 2⅝ in.	54
3½ and 4½ in.	72	3 and 3¼ in.	57
5 and 6 in.	65	3½ and 4½ in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.25 to 1.30
Nos. 9 to 10	1.30 to 1.35
Nos. 11 and 12	1.35 to 1.40
Nos. 13 and 14	1.45 to 1.50
Nos. 15 and 16	1.55 to 1.60

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	2.40
No. 12	2.50
Nos. 13 and 14	2.50
Nos. 15 and 16	2.60
Nos. 17 to 21	2.80
Nos. 22 and 24	2.90
Nos. 25 and 26	3.05
No. 27	3.25
No. 28	3.40
No. 29	3.55
No. 30	3.70

Pittsburgh

PITTSBURGH, PA., February 23, 1915.

The test as to whether the new price of 1.15c. will hold on plates, shapes and bars for March shipment will come in a short time. Mills report that buyers are placing orders very conservatively and will probably do so until fully convinced that the new price is firm. Some orders have been taken on these products at 1.15c. for March delivery, and some contracts placed for second quarter at 1.20c., but the aggregate of this business is not large. The recent advances in galvanized wire products, galvanized sheets and galvanized iron and steel pipe are reported as being firmly held. Galvanized sheets are up again this week $3 per ton, nearly all mills quoting 3.40c. for prompt shipment. The structural trade continues quiet, some of the larger jobs being held up. The increased operations among the mills in the Pittsburgh district are being held, and this week the Carnegie Steel Company is operating close to 65 per cent. of capacity. Prices on scrap are strong as the result of some heavy purchases by a local interest. Very little is doing in coke, as consumers are covered. The situation looks fairly good, but mill operators realize it is going to be a hard task to put up prices with operations not averaging 60 per cent.

Pig Iron.—There is practically no new demand, purchases being confined to small lots by foundries. One local interest has recently bought 3500 tons of cold blast charcoal iron at a rather low price. Bessemer iron is still nominally $13.60 at furnace, but none is being sold. We quote Bessemer iron at $13.60; basic, $12.50; malleable Bessemer, $12.75; No. 2 foundry, $13 to $13.25, and gray forge, $12.50, all at Valley furnace, with a freight rate of 95c. a ton for delivery in the Cleveland and Pittsburgh districts.

Structural Material.—Fabricators state that new inquiry is light. The report that 19,000 tons of steel for grade crossing work and track elevation at Indianapolis for the Pennsylvania Lines West has been divided between the McClintic-Marshall Company and the Riter-Conley Mfg. Company is not confirmed. Officials of these two concerns say they have no definite advices about receiving the contract, but on the contrary have been advised that this work will not be placed for some time. The Pennsylvania Lines West sent out inquiries recently for 5000 tons of bridge work. Work on the Munsey building at Washington, D. C., 1500 tons, taken about a year ago, has been resumed and the Jones & Laughlin Steel Company expects to start shipments on the steel within a short time. Bids go in to-day(Tuesday) on an interstate bridge at Portland, Ore., requiring 9000 tons. The new building for the Logan-Gregg Hardware Company in this city, it is now stated, will take about 1700 tons. This is expected to be placed soon. We quote beams and channels up to 15-in. at 1.10c. for prompt shipment, 1.15c. for March and 1.20c. for second quarter. Mills state that very little business has been placed with them at the higher prices.

Billets and Sheet Bars.—The local market on billets and sheet bars is firm, but some relatively low prices are being made in the Youngstown district. Consumers here and also in the valleys are pretty well covered, and there is little new buying. It is reported that a local mill will roll 2500 to 3000 tons of billets for foreign shipment. We quote Bessemer and open-hearth billets at $18 to $18.50, and Bessemer and open-hearth sheet bars $19, f.o.b. maker's mills, Youngstown; Bessemer and open-hearth billets, $19.50 to $20, and Bessemer and open-hearth sheet bars, $20.50 to $21, f.o.b. maker's mills, Pittsburgh. Forging billets are quoted at $24 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take $1 per ton extra. Axle billets are quoted at $21 to $22.

Ferroalloys.—The Jones & Laughlin Steel Company has blown out its stack at Aliquippa, Pa., that was making ferromanganese, having worked up all its Brazilian ore. The company states that with its own product and ferromanganese coming in on contract it is comfortably fixed for some months. As yet the embargo on English ferromanganese has not been lifted, and consumers are getting nervous over the situation. Small sales from stock are reported as high as $95, seaboard, for prompt shipment. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $18; 11 per cent., $19, and 12 per cent., $20, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Steel Rails.—The Carnegie Steel Company has taken 4000 tons more of standard sections for the Cincinnati, Hamilton & Dayton. There is some foreign inquiry for standard sections, but the business is slow in being closed up. New demand for light rails from coal-mining companies and lumber interests continues active. We quote standard section rails made of Bessemer stock at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots: 8 and 10 lb. section, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35, 40 and 45 lb. sections, 1.125c.

Plates.—On Wednesday, February 17, bids were opened at the Navy Department, Washington, D. C., on the plates, shapes and bars for the new battleship California. The Worth Brothers Company, Coatesville, Pa., was low bidder on all the plates, amounting to 9430 tons. The Carnegie Steel Company was low bidder on 2720 tons of shapes and 125 tons of bars. The Carbon Steel Company made the lowest price on 3250 tons of special-treatment plates. The new demand for plates is better, and the plate mills of the Carnegie Steel Company at Homestead are running at 75 per cent. or more of capacity. A very large amount of plates is being rolled at these works to be made into pipe for the National Tube Company. No orders are being placed for steel cars, nor is there any important new inquiry. We quote ¼-in. and heavier plates at 1.10c. for prompt shipment, 1.15c. for March and 1.20c. for second quarter.

Sheets.—Due to the continued rise in spelter, makers of galvanized sheets have again advanced prices $3 per ton, putting No. 28 gauge at 3.40c., the highest price it has reached in many years. None of the mills will take contracts for future delivery at this price and will sell only for prompt shipment. It is claimed that, with spelter at the prices now ruling, galvanized sheets could not be sold at 3.40c. for No. 28 and make a profit. Prices on black and blue annealed sheets are also firmer, partly due to the rise in galvanized and partly because of the expected shutdown of some of the sheet mills on account of the wage scale matter, which is in an unsettled condition. At present the two large sheet mills of the Brier Hill Steel Company at Niles, Ohio, are idle and will probably remain closed this week and next. Other sheet mills are running to 60 and 65 per cent. of capacity. Makers report that the demand for both black and galvanized sheets is heavier and shipments are larger than for some time. We quote No. 28 Bessemer black sheets at 1.80c. to 1.85c., No. 28 galvanized at 3.40c., Nos. 9 and 10 blue annealed sheets 1.30c. to 1.35c., with some sellers holding for the higher price;

No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26 and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

Tin Plate.—Specifications against contracts for tin plate are now coming in actively and this week the American Sheet and Tin Plate Company is operating at 95 per cent. of capacity. Other leading tin-plate mills are running from 75 to 100 per cent., and shipments are heavy. Tin plate destined for the Pacific coast is now going forward in large quantities, most of it via the Panama Canal. Prices are firm. One mill reports it has sold a number of nice orders for delivery up to July at the full price of $3.20 per base box. We quote tin plate at $3.10 to $3.20 per base box, f.o.b. Pittsburgh, the price depending on the order and deliveries wanted.

Wire Rods.—There is some foreign inquiry and one lot of 600 tons of open-hearth rods has been sold for shipment to England at a price that netted slightly above $25, Pittsburgh. The domestic demand is quiet, as consumers are covered, but specifications are coming in quite freely. Prices on rods are firm, due to the higher market on finished wire products. We quote Bessemer, open-hearth and chain rods at $25 to $25.50, Pittsburgh, one leading maker holding its rods firmly at the higher price.

Shafting.—Makers of shafting are now going over the list of extras with a view of making changes that will more nearly equalize them, and these will probably go into effect within the next month. It is not the intention to advance the extras, but to put them on a more equitable basis than they are now. The new demand for shafting is quiet, as consumers are covered mostly up to July, but specifications from the automobile and implement trades are heavy. We quote cold-rolled shafting at 67 to 68 per cent. off, but on a very desirable contract possibly 69 per cent. could be done.

Railroad Spikes.—An inquiry is in the market for 6000 kegs of standard railroad spikes for shipment to Russia. The United Railways of Baltimore has placed 850 kegs with an Eastern maker. The new demand is dull, as most of the railroads have covered their needs for 1915, and specifications are now coming in for shipments commencing late in March and April. Prices are not any higher, and we quote standard railroad spikes at $1.35 to $1.40, and small spikes at $1.45 to $1.50 in carload and larger lots, f.o.b. Pittsburgh.

Skelp.—New demand is a little better, due to the increased activity among the pipe mills. One local maker is shipping fairly large lots of grooved and sheared steel skelp abroad. Prices are firm, but no higher. We quote grooved steel skelp, 1.10c. to 1.15c.; sheared steel skelp, 1.15c. to 1.20c.; grooved iron skelp, 1.50c.; sheared iron skelp, 1.50c. to 1.60c., delivered to consumers' mills in the Pittsburgh district.

Hoops and Bands.—Several makers have advanced the price of steel hoops to 1.25c. minimum, and will not shade it. The new demand for hoops and bands is only fair, as most consumers are covered by contracts to April, and in some cases for a longer period. We quote steel bands at 1.10c. for spot shipment, 1.15c. for March and 1.20c. for second quarter. Steel hoops are held at 1.25c. at mill.

Wire Products.—The market on galvanized wire products is very strong, and some of the makers will not sell except for prompt shipment. As yet there has been no business placed in wire or wire nails at the recent advanced price, but specifications against contracts for wire nails at $1.50 and $1.55, and plain wire at $1.30 and $1.35 are coming in quite actively and shipments are heavy. Foreign inquiry for barb wire is heavier, and some fairly large lots are being sold. One local maker has a large amount of business on its books for foreign barb wire for delivery up to July. Prices on woven wire fencing have been lowered ½ point. On new orders we quote wire nails at $1.60; plain annealed wire, $1.40; galvanized barb wire and fence staples, $2; painted barb wire, $1.60; all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. for cash in ten days. We quote woven wire fencing at 72½ per cent. off in carload lots, 71½ per cent. on 1000-rod lots and 70½ per cent. on small lots, f.o.b. Pittsburgh.

Iron and Steel Bars.—Makers report that specifications against contracts for steel bars taken in December and early January at 1.05c. and 1.10c. are coming in very freely, and also that there has been a fair amount of new buying of steel bars at 1.15c. for March and a few contracts placed at the 1.20c. price for second quarter. It is probable consumers will go slow in placing orders at the higher prices until it is fully shown that the higher figures will hold. Shipments of steel bars by the mills are heavier now than for some months. The new demand for common iron bars is fair, but prices are no better. We quote steel bars for February shipment at 1.10c.; March, 1.15c., and for second quarter, 1.20c., f.o.b. Pittsburgh. Common iron bars, made from part scrap, are 1.10c. to 1.15c., makers' mill.

Merchant Steel.—Mills report that new demand for spring and other grades of steel are better, and it is believed new orders will show a material increase in the near future with the opening up of spring demand. Prices on small lots for prompt shipment are as follows: Iron finished tire, ⅛ x 1½ in., and larger, 1.30c., base; under ⅛ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c.

Cold-Rolled Strip Steel.—The new demand is only fair and mostly for small lots, most consumers being covered by contracts against which they are specifying freely. Prices are firm but unchanged. We quote hard-rolled steel, 1½-in. and wider, under 0.20 carbon, sheared or natural mill edges, per 100 lb., $2.75 delivered. Extras, which are standard among all the mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate tempers	Extras for straightening and cutting to lengths not less than 24 in.
0.100 and heavier	Base	$0.25	$0.10
0.099 to 0.050	$0.05	0.25	0.15
0.049 to 0.035	0.20	0.25	0.15
0.034 to 0.031	0.35	0.40	0.25
0.030 to 0.025	0.45	0.40	0.40
0.024 to 0.020	0.55	0.40	0.50
0.019 to 0.017	0.85	0.50	1.10
0.016 to 0.015	1.25	0.50	1.10
0.014 to 0.013	1.95	0.50	1.25
0.012	2.30	0.50	coils only
0.011	2.65	0.50	coils only
0.010	3.00	0.50	coils only

Wrought Pipe.—Mills report that new demand for tubular goods is steadily getting better, and one leading interest has already entered this month more orders than in all January. Prices are reported firm at the recent advances, especially on galvanized pipe. Operations among the pipe mills are slightly increasing, and it is believed the volume of business in the near future will be still heavier. One very large gas and one large oil line are in the market and may be closed at an early date. Discounts are being firmly held.

Boiler Tubes.—New demand for both locomotive and merchant tubes is quiet and mostly for small lots. Large consumers are covered by contracts and are specifying at a fair rate. Discounts are still more or less shaded, depending on the order.

Coke.—About the only activity in the coke trade is confined to the H. C. Frick Coke Company, which is steadily starting up ovens that have been idle for some time. This concern started last week 418 more ovens, making a total of 3733 started up by this company since January 1. W. J. Rainey Company has started 50 ovens at its Royal works in the Connellsville region, making 350 out of 375 ovens at this plant active. The new demand for both furnace and foundry coke is quiet, as consumers are covered and no merchant blast furnaces that buy coke are being started up. The Connellsville, Pa., Courier reports the output of coke in the upper and lower regions for the week ended Febru-

ary 13 as 250,855 tons, a decrease from the previous week of nearly 6000 tons. We quote standard makes of blast-furnace coke for prompt shipments from $1.50 to $1.60; on contracts for delivery up to July 1, $1.65, and for delivery over all of 1915, at $1.75 per net ton at oven. Standard makes of 72-hr. foundry coke are held at about $2 for prompt shipment and from $2.15 up to $2.50 on contracts.

Old Material.—Prices on selected heavy steel scrap are stronger and higher in Pittsburgh than in the outside district. One local consumer that has not been a buyer of scrap for a long time came in the market recently and bought several fairly large lots of selected heavy steel scrap at $12 or higher. At two or three other leading consuming points in the Pittsburgh district there is a congestion of cars loaded with scrap and these concerns will not take in any more until scrap loaded is out of the way. We note sales of about 7000 tons of selected heavy steel scrap for delivery in the Youngstown, Ohio, district at $11.50 per gross ton, delivered, and about 2000 tons in the Sharon, Pa., district at the same price, also a sale of 500 tons of machine shop turnings at $7.50, delivered. Prices are very firm but unchanged. For delivery to consumers' mills in the Pittsburgh and other consuming districts that take Pittsburgh freights dealers quote as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$11.75 to $12.00
Compressed side and end sheet scrap	10.25 to 10.50
No. 1 foundry cast	11.25 to 11.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	9.25 to 9.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	10.00 to 10.25
Railroad grate bars	8.50 to 8.75
Low phosphorus melting stock	13.25 to 13.50
Iron car axles	18.75 to 19.25
Steel car axles	13.25 to 13.75
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	9.75 to 10.00
No. 2 busheling scrap	7.00 to 7.25
Machine shop turnings	7.50 to 7.75
Old carwheels	10.75 to 11.00
Cast-iron borings	8.00 to 8.25
*Sheet bar crop ends	12.00 to 12.25
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	10.75 to 11.00
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	10.75 to 11.00

*Shipping point.

Chicago

CHICAGO, ILL., February 23, 1915.—(*By Wire.*)

But little activity is being displayed in the Chicago market on the record of the past week. Business has been secured in small but steady tonnages. The pig-iron market developed an interesting feature in the increase of inquiry for last half, the total amounting to approximately 15,000 tons. Though no contracts have yet been made, quotations were from 50c. to $1 per ton above the market price. Domestic and foreign inquiry in this market for low grade irons now aggregates 50,000 tons, and some sales are being made. Plates, shapes and bars are moving steadily with little of significance to report. The structural lettings of the week totaled 1400 tons. Rail orders were in the neighborhood of 18,000 tons and track supplies are moving with greater freedom as the spring opens up. Work was started last week on the new Union depot, and it is anticipated that several thousand men will be put to work within the next few weeks. The continued scarcity of spelter is affecting the Chicago market to a considerable extent, and one prominent sheet mill has already withdrawn from the market indefinitely. Little business in galvanized sheets is reported. Prices of steel products are generally firm.

Pig Iron.—The important feature is the better inquiry for last half, reported from several directions, the volume, producers feel, supporting their belief that prices will advance materially within the next few months. Prices have been asked on approximately 15,000 tons of coke iron for last half, and quotations have been made on the basis of a premium of 50c. to $1 per ton for that delivery. Sales to pipe manufacturers of low grade Southern iron are reported, and, as the buying from one interest, alone, was 17,000 tons, the estimate of a total of 50,000 tons does not seem too high. Current sales to nearby consumers do not exceed 1500 tons though made, it is stated, at slightly better prices. Prices are firm and unchanged. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 2 to 5	$15.75
Lake Superior charcoal, No. 1	16.25
Lake Superior charcoal, No. 6 and Scotch	16.75
Northern coke foundry, No. 1	$13.25 to 13.75
Northern coke foundry, No. 2	13.00 to 13.25
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft.	13.75 to 14.25
Southern coke, No. 2 f'dry and 2 soft.	13.50 to 13.75
Malleable Bessemer	13.00 to 13.25
Standard Bessemer	15.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackscn Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

(*By Mail*)

Rails and Track Supplies.—In round numbers, rail orders placed with local mills since our last report total 18,000 tons. Several transactions contributed to this aggregate. Specifications calling for fastenings are coming in freely. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, $23.50 to $25, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.07c.; 16 to 20 lb., 1.12c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., Chicago.

Structural Material.—The aggregate tonnage of steel included in the contracts for fabrication reported approximate only 1400 tons. There is little more of interest to be noted in other directions, conditions being generally quiet. Business placed included 793 tons for a department store at Lincoln, Neb., let to the Omaha Structural Steel Company; 248 tons for a business building at Kansas City, Mo., to the Kansas City Structural Steel Company; 200 tons for a coal handling plant at Manitowoc, Wis., and 160 tons for a Memphis, Tenn., ice plant, let to the Virginia Bridge & Iron Company. The only car inquiry of importance is that of the Santa Fé, which is said to be in the market for 500 refrigerator cars, but other new car buying is reported in process of negotiation. We continue to quote for Chicago delivery of plain shapes from mill, 1.289c.

We quote for Chicago delivery of structural material, from store, 1.75c.

Plates.—Car building continues at a low ebb and specifications for plates coming in to the mills are correspondingly light. A recent order was placed for approximately 7000 tons for car construction, outside of which the market has little life. We quote for Chicago delivery of plates from mill 1.239c. to 1.289c.

We quote for Chicago delivery of plates out of stock 1.75c.

Sheets.—The Chicago galvanized-sheet market is feeling the effect of the spelter situation acutely, and one of the large interests has been out of the market since February 18. Spelter is being quoted as high as 9.50c., with the result that little business, even for immediate shipment, is being placed. Consumers who were fortunate enough to have low-priced contracts are specifying with a freedom which suggests resales. Quotations for No. 28 galvanized vary from 3.25c. to 3.40c., Pittsburgh, and there is evidence that an increase in this quotation will be made shortly. Black sheets are attracting no unusual attention. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.489c.; No. 28 black, 1.989c.; No. 28 galvanized, 3.439c. to 3.539c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.60c.

Bars.—The bar situation is practically unchanged. Very little business has been done in bar iron, but there is evidence of contracts of substantial tonnage being placed for future delivery, engagements heretofore avoided by many mills. During the next week approxi-

mately 3500 tons of wagon hardware and tires will be placed in the Chicago district. That rolling mills are accumulating some additional backlog is shown by a report that one of the large mills turned out 1000 tons more in February than in the seven previous months. Reinforcing bars show signs of improvement and a recent order for the South called for 400 tons. For bar iron the minimum is now 1.10c., and the increased price of 1.15c. for March has already been made known. We quote for mill shipments as follows: Bar iron, 1.10c.; soft steel bars, 1.289c.; hard steel bars, 1.20c.; shafting in carloads, 65 to 68 per cent. off; less than carloads, 60 to 65 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 62 per cent. off.

Rivets and Bolts.—The recent upward revision in the prices of nuts and bolts appears to have been adopted by the manufacturers in general, a situation undoubtedly influenced, in part, by the firmer prices now prevailing for bars. Rivets are moving in a very limited way. Our quotations are as follows: Carriage bolts up to ⅝ x 6 in., rolled thread, 80-20; cut thread, 80-15; larger sizes, 80; machine bolts up to ⅝ x 4 in., rolled thread, 80-25; cut thread, 80-20; larger sizes, 80-5; coach screws, 85-5; hot pressed nuts, square, $6.80 to $6.60 off per cwt.; hexagon, $7.80 to $7.60 off per cwt. Structural rivets, ¾ to 1¼ in., 1.50c. to 1.55c., base, Chicago, in carload lots; boiler rivets, 10c., additional.

We quote out of store: Structural rivets, 2.00c.; boiler rivets, 2.10c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅝ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square, $6, and hexagon, $6.70 off per cwt.

Wire Products.—There is a substantial volume of wire being placed for domestic and foreign consumption. In nails and wire, specifications against contracts have been encouraging, and fence inquiry is anticipated in liberal tonnages during the spring months. It is reported that screen wire has advanced 10c. for the galvanized product, black wire being advanced also. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.589; wire nails, $1.789; painted bar wire, $1.789; galvanized, $2.189; polished staples, $1.789; galvanized, $2.189, all Chicago.

Old Material.—The past week saw but little market activity in scrap, prices being generally firm on all grades. The demand for busheling aggregated sufficient tonnage to strengthen that quotation somewhat and prices on both grades are advanced accordingly. Railroad offerings continue to be very light. The week's list shows the Burlington in the market with 2500 tons, including 500 tons of No. 1 wrought, while the Wabash has 15 cars of miscellaneous scrap. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Old iron rails	$11.75 to	$12.25
Old steel rails, rerolling	10.00 to	10.50
Old steel rails, less than 3 ft	10.00 to	10.25
Old carwheels	10.00 to	10.50
Heavy melting steel scrap	9.75 to	10.00
Frogs, switches and guards, cut apart	9.75 to	10.00
Shoveling steel	9.25 to	9.50
Steel axle turnings	7.25 to	7.50

	Per Net Ton	
Iron angles and splice bars	$11.50 to	$12.00
Iron arch bars and transoms	11.50 to	12.00
Steel angle bars	8.50 to	9.00
Iron car axles	13.75 to	14.25
Steel car axles	11.50 to	12.00
No. 1 railroad wrought	9.00 to	9.50
No. 2 railroad wrought	8.50 to	9.00
Cut forge	8.50 to	9.00
Steel knuckles and couplers	8.75 to	9.00
Steel springs	9.25 to	9.75
Locomotive tires, smooth	8.50 to	9.00
Machine shop turnings	5.50 to	6.00
Cast borings	4.75 to	5.25
No. 1 busheling	8.25 to	8.50
No. 2 busheling	7.25 to	7.50
No. 1 boilers, cut to sheets and rings	5.50 to	6.00
Boiler punchings	8.25 to	8.50
No. 1 cast scrap	9.00 to	9.25
Stove plate and light cast scrap	8.25 to	8.50
Grate bars	8.00 to	8.25
Railroad malleable	8.00 to	8.25
Agricultural malleable	7.25 to	7.50
Pipes and flues	7.00 to	7.50

Cast-Iron Pipe.—Some good business will be placed within the next two weeks when four Western cities will require approximately 8000 tons of pipe. Last week the American Cast Iron Pipe Company secured the 550 tons for Rockford, Ill., and the Glamorgan Pipe & Foundry Company took the 527 tons for Bay City, Mich. The 4250 tons for Portland, Ore., will also be let this week, it is understood, and on February 25 2500 tons for Minneapolis and 1500 tons for Toledo, Ohio. Bids will be placed for 2500 tons for Akron, Ohio, March 5, and 1200 tons for Duluth, Minn., March 4. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $25.50; 6 to 12 in., $23.50; 16 in. and up, $23, with $1 extra for gas pipe.

Philadelphia

PHILADELPHIA, PA., February 23, 1915.

The status of the market, taken generally, is but little changed so far as demand goes and the opinion is heard that with the pronounced spirit of economy now existent there can be none but a slow improvement. Quotations are said to be a little stronger, but this is due to the understanding that there will be an increase of $1 per ton March 1, on plates, shapes and bars. Less new business from the railroads is a cause of disappointment, though it is noted that one mill has accumulated sufficient orders from this source to start a part of its plant which has been idle. Several inquiries for export which at first looked doubtful have proved bona fide and resulted in business in semi-finished materials and wire. To-day, when the 5 per cent. advance in freight rates becomes effective, 9/10 of a cent has been added to the freight rate (15c. per 100 lb.) between Pittsburgh and Philadelphia. This makes the Philadelphia quotation on plates, shapes and bars 1.259c. per lb. for immediate delivery in carload lots. For part carloads the advance was to 1.291c. per lb. It is pointed out that the advance as made by the railroads is really one of 6 per cent. and that the new rate, if in accordance with the percentage of increase allowed, should be 15.8c. per 100 lb. for carloads and 18.9c. per 100 lb. for less than carloads. The difference is not understood. The buying of pig iron by cast-iron pipe makers has been heavy. Information received here is that ocean freights abroad are easier because the British Admiralty has released a number of vessels. This may have an important effect, both as regards the supply of ore for English furnaces and in lowering the tension of ocean transportation generally. The demand for structural material shows no signs of an awakening so far as new work is concerned, but the Pennsylvania Steel Company is going ahead with its contract for the big Memphis bridge, the construction of which had been held up. Plate makers are drawing business from the shipyards. Specifications for bars are holding up in a quiet way. Sheets and billets are dull, especially the latter. Hopes are stronger that the solution of the ferromanganese situation is near at hand. The mills are showing more interest in old material.

Iron Ore.—Advices received here are to the effect that freight rates on ore from Mediterranean to English ports are easier, following the release of a number of ships by the British Admiralty and the fewer vessels now employed in the transportation of grain. How permanent the relief thus afforded will be to makers of English iron remains to be seen. In the week ended February 20, 4760 tons of ore arrived at this port from Cuba.

Pig Iron.—A local pipe foundry has closed contracts for 30,000 tons of iron, about 25,000 tons of which will come from Southern furnaces, and the remainder from eastern Pennsylvania. For the larger quantity $9.25, Birmingham, is understood to have been paid, and for the Northern iron, $13.25 to $13.50, delivered. The general run of purchases, aside from those of low grade iron, have been small, but with some sellers the aggregate of the week showed a little improvement over that of the previous one. Others could detect no change in the situation. Not only are deliveries keeping up, but in some cases consumers are solicitous over prompt deliveries of small quantities. There is every indication

that foundry stocks are low. A sale of 500 tons of eastern Pennsylvania No. 2 X was made this week at $14.80, delivered. In this case the freight rate was 80c. No activity in basic is reported, and Lebanon low phosphorus is quiet. In standard low phosphorus, sales of about 3500 tons are recorded for the week. Full prices were paid. The widespread export inquiry for special Bessemer has yet to be closed so far as can be learned, and other foreign inquiries amounting to thousands of tons for export to France and Italy, terms c.i.f., have come out, but most of the specifications are unusual and show a lack of knowledge as to American conditions and of the values of irons of differing analyses. A great deal of attention is being given to freight schedules as revised to give the railroads the 5 per cent. advance which became effective February 23. Virginia iron is unaffected, as a reduction from $2.80 to $2.75 from furnace to Baltimore, Philadelphia, New York and Boston, and points taking like rates, was allowed a few months ago for a period of two years. Questions arising over "points taking like rates" have yet to be adjudicated. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X foundry	$14.25 to $14.50
Eastern Penna. No. 2 plain	14.00 to 14.25
Virginia No. 2 X foundry	15.25
Virginia No. 2 plain	15.00
Gray forge	13.25 to 13.50
Basic	13.50
Standard low phosphorus	20.00 to 20.50

Ferroalloys.—Only small sales, and few of these, have been made and for 80 per cent. ferromanganese the buyers paid about 6c. per lb., or $120 per ton. It is understood the English authorities are willing to release 5000 tons for shipment to this country, but that differences have arisen as to the apportionment of the tonnage among the various makers. A proposal has been made that an English representative come over here to see that the distribution to consumers is in accord with England's ideas. She wants no ferromanganese, in any form whatever, to reach her enemies. The nominal quotation is $68, seaboard. Contracts are being made to conform with the stipulations of the British Government, and it is hoped that shipments will soon be on the way. The first thought of agents here will be to take care of their contracts. The quotation for 50 per cent. ferrosilicon is unchanged at $71 to $73, Pittsburgh. A shipment of 22 tons of ferrosilicon arrived here from England last week.

Bars.—Specifications for small lots of steel bars continue to be received, often unexpectedly, and the price is holding firm. It is said there will be no deviation from 1.15c., Pittsburgh, or 1.309c., Philadelphia, after March 1. Until then the Pittsburgh base is 1.10c. On February 25 bids are to be opened by the city of Philadelphia for a bridge over South Broad street which will require about 375 tons of concrete reinforcing bars. Makers of iron bars are disappointed over the failure of demand to improve more speedily than it is doing. They quote 1.20c., Philadelphia.

Plates.—The Wm. Cramp & Sons Ship & Engine Building Company, Philadelphia, is to build three barges, each of which will take about 1500 tons of plates, for the Isthmian Canal Commission. The Harlan & Hollingsworth Corporation, Wilmington, has received an order for a second boat requiring 4000 tons of plates and shapes for the Anglo-Saxon Petroleum Company, London, England, and also will construct a ferryboat for the Fort Lee line, New York. Specifications have been better, at least with one company, which booked more business than it completed. Some purchasing on old options given when a lower price level prevailed than is the case to-day has come to light and is not pleasing to independent mills. The quotation until March 1 is 1.259c., Philadelphia, after which it will be 1.309c.

Steel Rails.—The buying of rails appears to have halted again, but a few additional orders have been placed. The Maryland Steel Company, whose rail mill at Sparrows Point, Md., has been shut down for months, on March 1 will begin rolling 2300 tons for the New York, Philadelphia & Norfolk Railroad. The company now has one furnace making ferromanganese and another will be started to make iron for the steel plant. For the present the plant will operate but five days a week and single turn. Sufficient orders have accumulated to operate on this basis for a time. The Virginian Railway is reported in the market for about 3000 tons of rails. The Public Service Corporation of Philadelphia has ordered 1300 tons of T rails from the Bethlehem Steel Company and some girder rails from two other makers.

Structural Material.—The Pennsylvania Steel Company has resumed work on the construction of the big Memphis bridge over the Mississippi River on which operations had been suspended for lack of funds. It will require about 16,000 tons of steel. The market continues most unsatisfactory so far as new work is concerned. Practically all the inquiry out consists of a few small bridges for the Pennsylvania Railroad, largely girder work. The general understanding is that the quotation will advance five points, March 1, to 1.309c., Philadelphia.

Sheets.—Demand is proceeding in a halting manner and prices show no signs of betterment, as might be expected. For No. 10 blue annealed sheets local makers quote 1.50c., Philadelphia, but 1.45c. can be done. Western competition on the part of a new mill is a factor in the situation.

Billets.—The market is inactive. The quotation for open-hearth rolling billets, based on $19 to $19.50, Pittsburgh, is $21.52, the freight rate having been advanced 12c. in accord with the new schedule. Forging steel commands about $4 more, according to specifications.

Coke.—No activity is seen in coke for any delivery. Quotations for prompt standard Connellsville furnace coke range from $1.50 to $1.60 per net ton at oven and $1.65 to $1.70 for first half shipment. Standard Connellsville foundry is quoted at $2 to $2.10 for prompt and $2.15 to $2.50 for contract. Freight rates from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—Buying has been unimportant, but encouragement is drawn from a more generous inquiry from some of the local mills. One has taken some heavy melting steel and others appear to be willing to do so providing they can make their own price. The tendency of dealers is to stiffen their quotations, some asking $10.50 to $10.75 for heavy steel. The navy yard, Philadelphia, will open bids March 9 on about 2000 tons of miscellaneous scrap. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$10.00 to $10.50
Old steel rails, rerolling	10.50 to 11.00
Low phosphorus heavy melting steel scrap	14.00 to 14.50
Old steel axles	13.75 to 14.25
Old iron axles	17.50 to 18.00
Old iron rails	13.00 to 14.00
Old carwheels	11.00 to 11.50
No. 1 railroad wrought	12.00 to 12.50
Wrought-iron pipe	10.00 to 10.50
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 busheling	7.75 to 8.25
Machine shop turnings	8.00 to 8.50
Cast borings	8.00 to 8.50
No. 1 cast	12.00 to 12.50
Grate bars, railroad	8.50 to 9.00
Stove plate	8.50 to 9.00
Railroad malleable	9.00 to 9.50

Cleveland

CLEVELAND, OHIO, February 23, 1915.

Iron Ore.—Most furnaces are still well supplied with ore, and dock shipments are light. There is no indication of a buying movement. We repeat 1914 prices as follows: Old Range Bessemer, $3.75; Mesaba Bessemer, $3.50; Old Range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—Some inquiry has come out for foundry iron for the last half, and one Cleveland seller has taken a few orders for that delivery at current prices and slightly higher. Generally the market is dull. Consumers are well covered with contracts and there is practically no demand for spot shipment iron. However, satisfaction is found in the fact that the foundry melt continues to improve slowly. A Cleveland con-

sumer has purchased 100 tons of malleable iron from an Ironton furnace at $12.75 at furnace, this iron being lower in manganese than that produced by local furnaces. A few small sales of Southern iron are reported at $9.50, Birmingham, for No. 2, at which price the market seems to be well maintained. We quote, delivered Cleveland, as follows:

Bessemer	$14.55
Basic	13.45
Northern No. 2 foundry	13.50
Southern No. 2 foundry	13.50
Gray forge	13.00
Jackson Co. silvery, 8 per cent. silicon	16.62 to 17.12
Standard low phos. at furnace	19.75 to 20.00

Coke.—The foundry coke market is very dull. Consumers generally are under contract and few spot shipment sales are being made. Shipments on contracts have improved. There is no demand for furnace grades. Foundry coke is held at $2 to $2.50 per net ton at oven. We quote standard Connellsville furnace coke at $1.50 to $1.60 for prompt shipment.

Finished Iron and Steel.—The demand has quieted down considerably. The advance in prices on steel bars, plates and structural material to 1.15c. March 1 has brought out a few current orders, but not so many as was expected. Consumers generally appear to be buying only for their actual early requirements. Prices are firm, except for plates, which are still being shaded for desirable orders. In structural lines interest is centered in the Clark avenue bridge, Cleveland, requiring 9400 tons, for which bids will be taken March 2. The Lake Shore Railroad Company has an inquiry out for 200 tons for bridge work and another inquiry is for steel for a seven-story addition to the Portage Hotel, Akron. With the approach of spring there is an improved inquiry for small lots of steel for building work. A Youngstown mill has advanced its price on sheet bars to $20 for April, $20.50 for May and $21 for June and has taken an order for the April requirements of an Ohio mill at $20. Prices on forging billets are still irregular, ranging from $22 to $24, Pittsburgh. Some of the Ohio sheet mills have shut down because of the refusal of employees to accept wage reductions, and as a result of the unsatisfactory labor conditions some dealers are refusing to take any orders except for prompt shipment, expecting that higher prices will prevail if many of the mills are shut down for any length of time. Most of the mills for some time have refused to sell galvanized sheets for future delivery because of the spelter situation. Bar iron is quiet, with the price unchanged, at 1.15c., Cleveland. Following the advance in prices on steel bars, local mills will probably advance iron bars $1 per ton March 1. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—There is a fair demand for bolts and nuts, and prices are apparently being firmly maintained. Rivet specifications are light. We quote rivets at 1.45c. for structural and 1.55c. for boiler, with $1 advance over these prices for small lots. Bolt and nut discounts are as follows: Common carriage bolts, ⅝ x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 80 per cent.; machine bolts with h.p. nuts, ⅝ x 4 in., smaller or shorter, rolled thread, 85 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 and 5 per cent.; coach and lag screws, 85 and 5 per cent.; square h.p. nuts, blank or tapped, $6.50 off; hexagon h.p. nuts, blank or tapped, $7.40 off; c.p.c. and t. square nuts, blank or tapped $6.20 off; hexagon ⅝ in. and larger, $7.50 and $7.75 off; 9/16 in. and smaller $8 and $8.25 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10, 10 and 5 per cent.; 9/16 in. and smaller 85, 10, 10 and 10 per cent.

Old Material.—There is a fair amount of activity between dealers but little demand from the mills. Consumers generally have good-sized stocks on hand or enough material to last for some time. The market is firm and many dealers are expecting higher prices and are refusing to make quotations. This sentiment, however, has not reached the producers, who are continuing to place their scrap on the market. Dealers have further advanced the price of heavy melting steel in this market 25c. A sale of 300 tons of new busheling to a local mill at $9 indicates firmness in this grade. We quote, f.o.b. Cleveland, as follows:

	Per Gross Ton	
Old steel rails, rerolling	$11.00 to	$11.75
Old iron rails		12.00
Steel car axles	13.25 to	13.50
Heavy melting steel	10.00 to	10.25
Old carwheels	10.00 to	10.50
Relaying rails, 50 lb. and over		22.50
Agricultural malleable	8.00 to	8.50
Railroad malleable	10.00 to	10.25
Light bundled sheet scrap	8.00 to	8.50
Per Net Ton		
Iron car axles	$16.00 to	$16.50
Cast borings	6.00 to	6.25
Iron and steel turnings and drillings	6.00 to	6.25
Steel axle turnings	6.25 to	6.50
No. 1 busheling new	8.75 to	9.00
No. 1 busheling old	8.50 to	8.75
No. 1 railroad wrought	9.50 to	10.00
No. 1 cast	10.00 to	10.50
Stove plate	7.50 to	7.75

Buffalo

BUFFALO, N. Y., February 23, 1915.

Pig Iron.—But little new business is reported for the week, and such orders as are coming in are of limited tonnage, principally carload lots. Most consumers are apparently well covered for their first quarter requirements and inquiry for forward needs is light. Practically the only exception to this condition is in pipe makers' iron, for which some activity in inquiry is noted. Radiator and boiler makers and machine-tool manufacturers are ordering out iron in good tonnages on existing contracts, and shipments from furnaces are going forward in fair volume. Prices, which are unchanged from last week, are as follows, f.o.b. furnace, for last half delivery:

No. 1 foundry	$13.25 to $13.50
No. 2 X foundry	13.00 to 13.25
No. 2 plain	13.00
No. 3 foundry	13.00
Gray forge	12.75 to 13.00
Malleable	13.00 to 13.25
Basic	13.50
Charcoal, regular grades and analysis,*	15.75 to 17.00

*The minimum applying only to direct shipments from furnace instead of from storage yards or docks at Buffalo.

Finished Iron and Steel.—Specifications are coming along in steady volume in moderate tonnages for bars and almost all other lines of finished products. Buyers in many instances are urging immediate shipment, indicating small stocks on hand and also that they are not inclined to anticipate their needs much in advance of actual requirements. One selling interest states, however, that a number of customers who had contracted for their estimated quantities for ordinary requirements for first quarter have already ordered out their full allotment on such contracts. Specifications for wire and wire products on contracts placed before the last advance are being received in good tonnages, also for steel pipe and tin plate. Bids are soon to be taken for about 200 tons of structural steel for a storage warehouse and stable for the West End Brewing Company, Utica, and for about 100 tons for a girls' high school building for the Nazareth Academy, Rochester. A contract will soon be placed for 100 tons required for the Security Savings & Trust Company's building, Erie, Pa. Smith & Caffrey, Syracuse, have contract for steel for the St. Matthews Roman Catholic Church, that city, about 150 tons.

Old Material.—The market is quiet. The principal local mills have covered their requirements for heavy melting steel for the time being and such sales as are being made are for shipment to the Pittsburgh and Valley districts. Prices are unchanged, quotations being as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$10.50 to $10.75
Low phosphorus steel	12.50 to 13.00
No. 1 railroad wrought scrap	10.00 to 10.50
No. 1 railroad and machinery cast	10.50 to 11.00
Old steel axles	12.00 to 12.50
Old iron axles	16.00 to 16.50
Old carwheels	10.00 to 10.50
Railroad malleable	9.50 to 10.00
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	8.50 to 9.00
Clean cast borings	6.00 to 6.50
Old iron rails	11.00 to 11.50
Locomotive grate bars	9.00 to 9.50
Stove plate (net ton)	8.25 to 8.75
Wrought pipe	6.50 to 7.00
Bundled sheet scrap	7.00 to 7.50
No. 1 busheling scrap	7.50 to 8.00
No. 2 busheling scrap	5.25 to 5.75
Bundled tin scrap	10.00

Cincinnati

CINCINNATI, OHIO, February 23, 1915.

Pig Iron.—Several of the larger users of foundry iron are now taking an interest in the market and a number of inquiries have been issued. As a rule, buyers are asking for quotations on last half, although a few need iron to carry them through the second quarter. A melter in central Ohio wants 1000 tons of foundry iron, while others in the same territory are inquiring for smaller tonnages of both Northern and Southern brands. A live inquiry for 2000 tons of malleable also comes from an Ohio manufacturer for shipment in next six months. Southern Indiana furnishes a prospective customer for 900 tons of foundry grades, with shipments to extend through the third quarter. Several 500-ton sales of Southern iron have been reported lately and some Northern iron has also changed hands. Prices are unchanged, but it is known that Northern No. 2 can be purchased at $12.75, Ironton, for strictly last half shipment, where the tonnage involved is attractive. Southern quotations range from $9.50 to $10, Birmingham, the first named being considered minimum for nearby shipment. The trade is generally inclined to regard the situation as showing some improvement that was not noticeable two weeks ago. Little new business is reported in Ohio silvery irons, as melters are understood to be covered for most of their requirements for the first half and some for even a further extended period. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	$12.90 to $13.40
Southern coke, No. 2 f'dry and 2 soft.	12.40 to 12.90
Southern coke, No. 3 foundry	11.90 to 12.40
Southern No. 4 foundry	11.40 to 11.90
Southern gray forge	10.90 to 11.40
Ohio silvery, 8 per cent. silicon	16.26 to 16.51
Southern Ohio coke, No. 1	15.01 to 15.51
Southern Ohio coke, No. 2	14.01 to 14.51
Southern Ohio coke, No. 3	13.76 to 14.01
Southern Ohio malleable Bessemer	14.26
Basic, Northern	14.26
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	26.90 to 27.40

Coke.—The market is dragging as far as any demand is concerned. Shipments on foundry contracts continue fairly satisfactory. The open weather has curtailed the consumption of domestic coke. We quote furnace coke, in all three fields, at $1.50 to $1.75 per net ton at oven, and foundry coke at $2 to $2.50.

Finished Material.—Further advances have been announced on both black and galvanized sheets. Black sheets are now quoted at 1.90c., Pittsburgh, while No. 28 galvanized sheets are held at 3.40c., Pittsburgh, making an advance for the latter of $3 per net ton over last week's quotations. The mills in this territory are not willing to quote galvanized sheets except on prompt specifications, because of the continued uncertainty as to the spelter market. Quite a number of sheet orders were booked last week, and the buying was not confined to small consumers who needed a rush supply. Steel bars are quiet, but there is probably a slightly better inquiry for hoops and bands.

Old Material.—Business is somewhat slacker in all grades, with the exception that a few small lots of No. 1 machinery cast have been taken lately by the local foundries. The minimum figures given below represent what dealers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. yards:

Per Gross Ton

Bundled sheet scrap	$6.25 to $6.75
Old iron rails	11.00 to 12.00
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	9.75 to 10.25
Melting steel rails	8.75 to 9.25
Heavy melting steel scrap	8.50 to 9.00

Per Net Ton

No. 1 railroad wrought	$7.50 to $8.00
Cast borings	4.00 to 4.50
Steel turnings	4.00 to 4.50
Railroad cast scrap	9.25 to 9.75
No. 1 machinery cast scrap	9.75 to 10.25
Burnt scrap	6.00 to 6.50
Old iron axles	13.50 to 14.00
Locomotive tires (smooth inside)	8.75 to 9.25
Pipes and flues	5.50 to 6.00
Malleable and steel scrap	6.75 to 7.25
Railroad tank and sheet scrap	4.50 to 5.00

St. Louis

ST. LOUIS, MO., February 22, 1915.

Pig Iron.—The demand continues to show some interesting evidences of life. While the aggregate of sales is not large, probably not more than 3000 tons for the week, the number of transactions and the demand for prompt shipment are such as to demonstrate clearly that there is increasing and immediate need for material for melting. Inquiries are pending for a number of small lots, none greater than 300 tons, all for early delivery.

Coke.—Contract business is at a standstill, this being the off-season, but there is some activity in small lots for immediate use which command somewhat higher prices than the quotation made on the Connellsville basis. By-product coke is still following Connellsville, with $2.80 freight rate added for St. Louis delivery.

Finished Iron and Steel.—There is a continuance of the increase in volume of business, and the firmness of prices is well maintained. Fabricators continue to buy for specific work chiefly, but some are making inquiries for material on contract basis evidently with a view to protecting themselves against the business they see in sight. Structural material is moving more heavily each week. Buyers of bars are still somewhat conservative, but reinforcing material is showing more activity in inquiry, chiefly because of the approach of the season for renewal of building operations. In rails there are increasing indications of the interest of the railroads, but no definite inquiries have made their appearance. Light rails are in some request, but no great increase in the aggregate of orders is to be reported. Movement out of warehouse continues good and prices are maintained firmly, due to the present tendency of fabricators and other consumers to prefer the higher price of warehouse material to committing themselves to long time contracts with lower prices. Prices for warehouse stock are as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plates, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, cold rolled, 2.55c.; No. 28 galvanized sheets, black sheet gauge, 3.55c.

Old Material.—Despite the softening tendency previously noted, there has been no disposition to reduce prices. The demand continues rather light, but the small lots taken and the continuous character of the movement hold the confidence of the dealers in good shape. Relayers have become particularly active with the approach of the spring construction and replacement season, and there is a greater demand than can be filled at the moment from the stocks available. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton

Old iron rails	$10.50 to $10.75
Old steel rails, re-rolling	10.25 to 10.50
Old steel rails, less than 3 feet	11.50 to 12.00
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	10.25 to 10.50
No. 1 railroad heavy melting steel scrap	9.50 to 9.75
Shoveling steel	8.75 to 9.00
Frogs, switches and guards cut apart	9.75 to 10.00
Bundled sheet scrap	6.00 to 6.25

Per Net Ton

Iron angle bars	$10.75 to $11.00
Steel angle bars	9.00 to 9.25
Iron car axles	15.00 to 15.50
Steel car axles	10.75 to 11.00
Wrought arch bars and transoms	11.25 to 11.50
No. 1 railroad wrought	8.25 to 8.50
No. 2 railroad wrought	8.00 to 8.25
Railroad springs	8.75 to 9.00
Steel couplers and knuckles	9.00 to 9.25
Locomotive tires, 42" and over, smooth inside	9.00 to 9.25
No. 1 dealers' forge	7.50 to 7.75
Mixed borings	5.25 to 5.50
No. 1 busheling	7.75 to 8.00
No. 1 boilers, cut to sheets and rings	6.25 to 6.50
No. 1 railroad cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.00 to 8.25
Railroad malleable	7.25 to 7.50
Agricultural malleable	6.75 to 7.00
Pipes and flues	6.25 to 6.50
Railroad sheet and tank scrap	6.25 to 6.50
Railroad grate bars	7.50 to 7.75
Machine shop turnings	5.75 to 6.00

Inquiries in the market for locomotives are for 20 Mallet type by the Chesapeake & Ohio and for 10 Pacific and 20 Mikado type by the Missouri, Kansas & Texas.

Birmingham

BIRMINGHAM, ALA., February 20, 1915.

Pig **Iron.**—Considerably more business has apparently been done in the past ten days than in a similar period for some time. The largest order reported is for 10,000 tons for English delivery, taken by the Sloss-Sheffield Steel & Iron Company. President Maben, of that company, says he could get more foreign orders if he could secure ship room. Another company has sold over 20,000 tons so far this month. The general tone is one of real improvement. A gratifying feature is the increasing disposition of Southern melters to take iron ordered. From the leading interest down there seems to be more elasticity in transactions of all kinds—just enough to give ground for a bit of optimism, against which the offset is, of course, the European war. Shipments both of pig iron and of cast-iron pipe have been made down the Warrior River from the plant of the Central Coal & Iron Company at Holt, which is directly on the river. This traffic seems to point to the securing of some excellent freight rates to the gulf at Mobile and New Orleans. The Southeastern railroads have recently checked up freight rates on cement, coal, radiators and a number of metal products to the gulf and South Atlantic coast and will shortly announce reductions, which, it is believed, will serve to increase the Birmingham district's business, especially for export. The local steel situation continues to be good compared with the latter portion of last year. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$10.00 to $10.25
No. 2 foundry and soft	9.50 to 9.75
No. 3 foundry	9.00 to 9.25
No. 4 foundry	8.75 to 9.00
Gray forge	8.50 to 8.75
Basic	9.50 to 10.00
Charcoal	22.50 to 23.00

Cast-Iron Pipe.—An interesting event is the shipment of 750 tons of pipe from the Holt plant of the Central Iron Company down the Warrior River, to go to the city of Plaquemine, La., via New Orleans. This will be carried by self-propelling barges of the Alabama & New Orleans Transportation Company. An order for Corpus Christi, Texas, or 7200 tons is also reported. The pipe shops are operating at 75 per cent. now, and indications continue to point to still better conditions. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., $20; 6-in. and upward, $18.

Coal and Coke.—The general coal market is still slow. Heavy shipments of by-product coke to Texas are reported, and there is a movement to Western points. Prices remain about the same. We quote, per net ton, f.o.b. oven, as follows: Furnace, $2.75 to $2.90; foundry, $3.25 to $3.50; with $3.75 for one or two special brands.

Old Material.—There has been an increase in the volume of business, owing to enlargement of operations at scrap-using plants. The business has, however, not been sufficient to advance prices. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$13.00 to $13.50
Old steel axles	12.50 to 13.00
Old iron rails	12.00 to 12.50
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	7.50 to 8.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.00 to 7.50
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	8.50 to 9.00
Stove plate	8.00 to 8.50

Boston

BOSTON, MASS., February 23, 1915.

Old Material.—The market has changed very little in the week, though the dealers and producers of scrap are perhaps more convinced than ever that the upward tendency of business is constantly becoming more assured. Transactions are not important. Prices have not changed. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel	$8.25 to $8.50
Low phosphorus steel	13.75 to 14.75
Old steel axles	12.75 to 13.25
Old iron axles	20.25 to 20.75
Mixed shafting	12.00 to 12.25
No. 1 steel wrought and soft steel	8.25 to 8.75
Skeleton (bundled)	5.50 to 5.75
Wrought-iron pipe	7.00 to 7.50
Cotton ties (bundled)	5.25 to 5.75
No. 2 light	3.25 to 3.75
Wrought turnings	5.00 to 5.50
Cast borings	5.00 to 5.25
Malleable	7.50 to 7.75
Stove plate	7.00 to 7.50
Grate bars	5.25 to 5.50
Machinery cast (price to consumers)	11.25 to 11.50

New York

NEW YORK, February 24, 1915.

Pig Iron.—The movement of contract iron to consumers, fairly satisfactory for some time past, was enhanced somewhat in the past several days in anticipation of the 5 per cent. increase in freight rates, effective this week in this territory. Further sales of foundry iron to local consumers have been few and scattered. The purchase of one lot of 800 tons and another of 400 tons by New Jersey melters is noted, while a few orders for smaller amounts were taken for New England delivery. In connection with the placing of this latter business it is stated that quotations on Buffalo iron, equivalent to $12.75 at furnace, appeared through resale channels, but, as for the market generally, prices are unchanged. The export situation has been further enlivened by the booking of 40,000 tons of Southern iron for shipment to Italy. So little progress has been made in securing boats in connection with export orders previously taken that this business is understood to have been placed with interests capable of assuring vessel capacity. On the basis of a 5 per cent. increase in rates, with quotations f.o.b. furnace unchanged, we quote Northern iron for tidewater delivery as follows: No. 1 foundry, $14.50 to $15; No. 2 X, $14.25 to $14.50; No. 2 plain, $14 to 14.25. Southern iron may be quoted at $14.50 for No. 1 and $14 to 14.25 for No. 2.

Ferroalloys.—The lifting of the British embargo on ferromanganese is rumored to have been effected, but definite official confirmation of this is not obtainable. It is likely, however, that some solution is near at hand, but no shipments have been made nor any notice received as to when any may be expected. Should arrangements be made for the release of the alloy for shipment to this country doubt is expressed whether the "war zone" conditions and others growing out of it may not act as a barrier. It is stated that anxiety on the part of consumers here in general is growing each week, especially those not liberally covered. Sales of spot material as high as $90 to $100, seaboard, are rumored, but if actually made the tonnage is probably small. Spiegeleisen is active, several foreign contracts having been reported closed for March and April delivery. The nominal quotation for ferromanganese remains $68, seaboard, when obtainable. Nothing more is heard definitely of the proposition to "marry contracts." The ferrosilicon market remains normal, the 50 per cent. product being obtainable at $71 to $73, Pittsburgh.

Cast Iron Pipe.—Bids are to be received on February 26 by the Board of Water Commissioners of Holyoke, Mass., for 470 tons of 6, 8, 12 and 20-in. pipe; on March 1 by the Board of Water Supply of New York for 260 tons of 12-in., 60 tons of valve boxes and 20 tons of fittings, and on March 2 by the Board of Water Commissioners of Hartford, Conn., for 1745 tons of 6, 8, 10, 12, 16 and 20-in. pipe and 45 tons of fittings. The Warren Foundry & Machine Company was awarded the contract for the 375 tons for Revere, Mass. General buying has not bettered and keen competition continues to be the rule. Carload lots of 6-in. are available at $20 to $20.50 per net ton, tidewater.

Structural Material.—New projects are not yet appearing in sufficient volume to lend much hope toward

the desired early stiffening of prices. The largest new proposal, involving 3000 tons, is for the Ocean Steamship Company for pier work at Savannah, Ga. Other large projects, all of which, however, are not yet actively before the market, include: 1500 tons for the Wheelock Building, Thirty-third street, near Park avenue; 1500 tons for an office building at Canal street and Broadway; 1800 tons for the Brokaw Building, Forty-second street and Broadway; 300 tons for the Department of Docks and Ferries, New York, for a pier at Forty-sixth street and North river; 250 tons for the Atlantic Coast Line for a lift bridge at Tampa, Fla., and 750 tons of bridge work for the Chesapeake & Ohio. The awards of the week embrace 500 tons for the Y. M. C. A., Union branch, Bronx borough, to the Hay Foundry & Iron Works; 300 tons for two bridges for the Erie to the Lackawanna Bridge Company; 500 tons for an apartment at Eighty-eighth street and Broadway to the Passaic Steel Company; 400 tons for the McKinley school, Newark, to the Phoenix Iron Company; 300 tons for an almshouse, Bridgeport, Conn., to the Phoenix Iron Company, and 300 tons for contagious hospital buildings, Philadelphia, to the McClintic-Marshall Company. We quote mill shipments at 1.10c. to 1.15c., Pittsburgh, or 1.269c. to 1.319c., New York, and from store 1.85c. to 1.90c., New York.

Plates.—The market for plates for railroad cars does not hold out so much as it did two or three weeks ago, for while some orders have been placed new inquiry has not come in to replace the work let. The Haskell & Barker Car Company has taken 700 cars for the Sante Fé as well as the 750 stock cars for the Union Pacific, and the Cambria Steel Company is to build 15 cars for Spang, Chalfant & Co., Pittsburgh. Fifteen passenger equipment cars for the Chicago & Milwaukee electric line are also reported closed. The Illinois Central is considering 100 gondolas and the Boston & Maine is asking for prices on 3000 underframes with deliveries somewhat extended. The Staten Island Shipbuilding Company is to build a boat for the Central Railroad of New Jersey, but no other new boat work in this section is noted. We quote steel plates at 1.10c. to 1.15c., Pittsburgh, or 1.269c. to 1.319c., New York, and from store 1.85c. to 1.90c., New York.

Steel and Iron Bars.—Specifications on contracts have averaged in February higher than in January, and with the bulk of the tonnage under contract, no great concern seems to exist that 1.15c., Pittsburgh, will not be firmly held for March. Notwithstanding reports are somewhat numerous of prices on new buying below current quotations. Against this is at least one quotation for a round tonnage of export at between 1.10c. and 1.15c., Pittsburgh. A steady improvement is noted in bar iron, but complaint from makers that prices are too low. We quote mill shipments of steel bars at 1.10c. to 1.15c., Pittsburgh, or 1.269c. to 1.319c., New York. Out of store in New York we quote iron and steel bars at 1.80c. to 1.85c.

Old Material.—The market shows no great strength, buyers hesitating to make commitments, though in need of material, others being hypercritical with regard to the character of the material supplied, and occasionally others seeking to secure cancellations or at best an extension of delivery date. Owing to the small amount of business, dealers' prices are nominally at last week's quotations, per gross ton, New York, as follows:

Old girder and T rails for melting	$8.00 to	$8.25
Heavy melting steel scrap	8.00 to	8.25
Relaying rails	19.00 to	19.50
Rerolling rails (nominal)	8.25 to	8.50
Iron car axles	15.00 to	15.25
Steel car axles	11.25 to	11.75
No. 1 railroad wrought	9.75 to	10.25
Wrought-iron track scrap	9.25 to	9.75
No. 1 yard wrought, long	9.25 to	9.75
No. 1 yard wrought, short	8.25 to	8.50
Light iron	3.50 to	4.00
Cast borings	5.75 to	6.25
Wrought turnings	5.75 to	6.25
Wrought pipe	7.50 to	7.75
Carwheels	9.00 to	9.25
No. 1 heavy cast, broken up	10.25 to	10.50
Stove plate	8.00 to	8.25
Locomotive grate bars	7.00 to	7.50
Malleable cast	7.00 to	7.50

British Pig Iron Dull But Firm

Labor and Other Troubles—Japan Wants Tin Plate and China Rails

(*By Cable*)

LONDON, ENGLAND, February 24, 1915.

Shortage of labor, strikes, railway congestion and excessively dear fuel are all operating adversely on output and consumption. Pig iron is dull but firm; deliveries are trifling by sea but good by rail. The ore position is tightening and hematite is firmer with no pressure to sell. Southern iron is available for export but freight has hitherto been impossible to arrange. Active furnaces in the three principal districts number 166 against 165 a year ago. Stocks of pig iron in Connal's stores amount to 122,858 tons against 121,077 tons last week.

All finished material is firm. Japan is inquiring for 14 x 18¾-in., 14 x 19¼-in. and 20 x 10-in. tin plates. China wants 9000 tons of rails. We quote as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 15s. ($3.65).

Cleveland pig iron warrants, 56s. ($13.63) against 56s. 9d. ($13.81) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 56s. 9d. ($13.81) against 56s. 5d. ($13.72) last week.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £10 5s. ($49.88) against £10 ($48.66) last week.

Steel ship plates, Scotch, delivered local yards, £8 10s. ($41.36).

Steel rails, export, f.o.b. works port, £7 2s. 6d. ($34.67).

Hematite pig iron, f.o.b. Tees, 92s. 6d. ($22.51) against 90s. ($21.89) last week.

Sheet bars (Welsh), delivered at works in Swansea Valley, £6 10s. ($31.63).

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £8 ($38.93).

Steel bars, export, f.o.b. Clyde, £8 10s. ($41.36) against £8 5s. ($40.14) a week ago.

Metal Market

NEW YORK, February 24, 1915.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
Feb.	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
17	15.25	14.62½	36.12½	3.85	3.75	9.10	8.95
18	15.25	14.62½	37.25	3.85	3.77½	9.25	9.10
19	15.25	14.62½	39.45	3.85	3.77½	9.50	9.35
20	15.25	14.62½	39.50	3.85	3.77½	9.50	9.35
23	15.25	14.62½	38.60	3.85	3.77½	9.50	9.35

Electrolytic copper continues in light demand, but the heavy direct or indirect call for export holds up. Tin is higher following a sharp rise in London which has tapered off. Lead is unchanged in New York but higher in St. Louis. The advancing trend of spelter has not halted. No English antimony is coming here.

New York

Copper.—The demand for home consumption shows no betterment. The interest continues to be centered in Lake which in large quantities is going into munitions of war for export. On February 17 producers reduced their quotation for electrolytic to 14.62½c., cash, New York. Prior thereto there had been offerings at this figure, but it was on the part of second hands. Some export business in electrolytic has been done. Sales of Lake continue at 15.25c., cash, New York, and some of a good brand at 15.12½c., though there have been few of the latter. The less favored brands have sold down to 14.62½c. Copper exports this month total 4259 tons.

Tin.—In the week the tin market gained considerable strength, then relaxed, though the market to-day is not by any means weak. Only a moderate amount

of business has been done. Up to February 18 there were sales of spot on the part of sellers who replaced the metal they sold by buying nearby future positions, thereby making a good margin of profit. On that day they found it was growing difficult to replace the tin they disposed of, as the holders of nearby future delivery would not let go of their holdings and prices advanced. Spot tin in warehouse was difficult to buy under 40c. on February 19 and despite a feverish demand for both spot and March and April there were but few sales. The London market on that day advanced £6 on spot and £4 on futures, spot closing at £185 and futures at £159, c.i.f. London. Inquiries in New York easily totaled 100 tons. On February 20 there was some business at 39.50c. for spot. On February 22 there again were sharp advances in London, but yesterday the advances were followed by a sharp break, the decline on spot Straits being £8. The market here responded, became top heavy and sellers were eager to do business at about 38.60c. There are indications of direct shipments here of Banca tin. Already sales of a moderate tonnage have been made. Some consumers here use Banca if they can get it under the price of Straits tin, while some others who use comparatively small lots will pay a small premium. It is reported that some of the Banca tin, which has been stored in Holland, has quite recently been sold to Germany. Arrivals this month total 3180 tons and there is afloat 2510 tons.

Lead.—The recent action of the principal interest in advancing the price $1 per ton stirred up a good bit of business. Toward the end of last week sales were made at 3.77½c. to 3.80c., f.o.b. St. Louis. The New York price is unchanged at 3.85c. The London quotation to-day is £20, having advanced 6s. 3d. since February 19. There are indications that there is a greater inclination on the part of London to follow this market than has ever existed before. Foreign consumption is good.

Spelter.—Under the influence of the scarcity of spot and nearby metal quotations have continued to advance and to-day they are about 9.50c., New York, and 9.35c., St. Louis, but entirely nominal. Inquiry, both domestic and foreign, continues large.

Antimony.—English brands are not coming to this country and prices have continued to advance, though the trend in that direction is slower. Chinese antimony is quoted at 18c., duty paid, Hallett's at 19c. to 20c., and Cookson's at 21c.

Old Metals.—The market is fairly good. Dealers' selling prices have been advanced and are now as follows:

	Cents per lb.
Copper, heavy and crucible	13.25 to 13.75
Copper, heavy and wire	13.00 to 13.50
Copper, light and bottoms	12.00 to 12.50
Brass, heavy	9.00 to 9.25
Brass, light	7.50 to 7.75
Heavy machine composition	11.25 to 11.75
Clean brass turnings	9.25 to 9.50
Composition turnings	9.75 to 10.00
Lead, heavy	3.50
Lead, tea	3.25
Zinc, scrap	7.00

Chicago

FEBRUARY 23.—Spelter is quoted at 9.30c. to 9.50c. Chicago, and the situation is, if anything, more acute. Very little change is to be noted in the new or old metal markets. The copper market is still somewhat unsettled, though displaying tendencies to greater firmness. We have revised our prices and quote as follows: Casting copper, 14.50c.; Lake copper, 14.75c., for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 36.875 c.; small lots, 39c.; lead, desilverized, 3.75c., and corroding, 4c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 8.70c.; sheet zinc, 10.50c.; Cookson's antimony, 22c., for cask lots; other grades 18c. to 20c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11.75c.; copper bottoms, 9.75c.; copper clips, 11.50c.; red brass, 10.25c.; yellow brass, 8.25c.; lead pipe, 3.25c.; zinc, 5.50c.; pewter, No. 1, 23c.; tinfoil, 30c.; block tin pipe, 33c.

St. Louis

FEBRUARY 22.—There has been a continuance of the excitement in spelter, with the result that the quotation to-day is about 9.25c., with no assurance that the metal can be had at that figure. Lead is higher at 3.77½c. Tin is quoted at 39c.; Lake copper, 15c.; electrolytic copper, 14.90c.; Cookson's antimony, 21c. In the Joplin ore market zinc blende ranged from $65 to $75 per ton for 60 per cent. with the settlement for choicest lots as high as $78. Calamine was higher, with the choicest grades bringing $50, while the range for 40 per cent. was about $40 to $45. Lead ore was firm at $47 with indications of some advance. Scrap metals show increased strength and quotations to-day are as follows: Light brass, 6c.; heavy yellow brass, 7.50c.; heavy red brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; tea lead, 3.50c.; zinc, 3.50c.; lead, 3.50c.; pewter, 23c.; tinfoil, 26c.

Iron and Industrial Stocks

NEW YORK, February 24, 1915.

The stock market is now extremely sensitive to war news, because of the possibilities growing out of casualties to American ships in the war zone on the British and German coasts. Quite a number of industrial stocks felt so much pressure that the committee of the New York Stock Exchange having such matters in charge established new minimum prices as follows: American Car & Foundry common, 40; American Locomotive preferred, 80; American Steel Foundries, 24; Pressed Steel Car preferred, 94. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., pref.	34	- 35	Int. Harv. of N. J., com.	92	- 96
Am. Can, com.	25⅞	- 27⅞	Lackawanna Steel	28½	
Am. Can, pref.	92¼	- 94	Nat. En. & St., com.	10	- 10⅛
Am. Car & Fdy., com.	40	- 44½	Pressed Stl., com.	27	- 29¼
Am. Car & Fdy., pref.	112		Ry. Spring, com.	21	- 21⅛
Am. Loco., com.	21⅝	- 21½	Republic, com.	19⅛	
Am. Loco., pref.	81		Republic, pref.	72½	
Am. Steel Fdries.	26⅞	- 27	Rumely Co., com.	1	- 1¼
Bald. Loco., com.	30½		Rumely Co., pref.	4	- 4¼
Bald. Loco., pref.	100		Pipe, pref.	33½	- 34
Beth. Steel, com.	54	- 56¾	U. S. Steel, com.	40¾	- 43
Beth. Steel, pref.	103¼	-104¾	U. S. Steel, pref.	103⅝	-104½
Case (J. I.), pref.	77½	- 78	West'gh'se Elec.	64¾	- 69⅝
Colorado Fuel	23¼	- 25⅝	Chic. Pneu. Tool	47½	
General Elec.	140	-142⅝	Cambria Steel	41	- 42½
Gt. No. Ore Cert.	29	- 31	Cruc. Steel, com.	13½	- 14
Int. Harv. Corp., com.	55		Cruc. Steel, pref.	77	
			Harb.-Wk. Ref., pref.	97½	

Dividends

The International Oxygen Company, 6 per cent. on all outstanding stock of the company.

The General Electric Company, regular quarterly, 2 per cent., payable April 15.

The Harbison-Walker Refractories Company, regular quarterly, ½ of 1 per cent. on the common stock, payable March 1.

The Mergenthaler Linotype Company, regular quarterly, 2½ per cent., payable March 31.

The Moline Plow Company, regular quarterly, 1¾ per cent. on the first preferred stock, payable March 1.

The National Lead Company, regular quarterly, ¾ of 1 per cent. on the common stock, payable March 31.

The New York Air Brake Company, regular quarterly, 1½ per cent., payable March 26.

The Electric Storage Battery Company, regular quarterly, 1 per cent. on the common and preferred stocks, payable April 1.

The Thomas Iron Company, which has for some time been operating only one of its blast furnaces, a small Alburtis stack, will start one of its large stacks at Hokendauqua, Pa., March 1. During the period of idleness as many men as possible were kept at work relining the furnaces and making other necessary repairs.

The Clarage Foundry & Mfg. Company, builder of heating, ventilating and drying apparatus and blowers and fans, Kalamazoo, Mich., has changed its name to the Clarage Fan Company.

Pittsburgh and Nearby Districts

The Westinghouse Electric & Mfg. Company will take over in a few days the entire holdings of the Westinghouse Machine Company at East Pittsburgh, Pa., and will operate its works. Some important changes among officials of the latter company will soon be made.

In spite of the depression in the steel trade last year, the Apollo Steel Company, Apollo, Pa., manufacturer of black and galvanized iron and steel sheets, reports that it employed an average of 372 men, to whom $363,000 was paid in wages. Out of 276 working days, its plant operated 270, and its total sales were $1,637,000, turning over its capital nearly six times. Its total output of black and galvanized sheets was 30,000 net tons.

The Ohio Wood Preserving Company, Pittsburgh, has secured an order for 20,000 sq. yd. of wood block floor for the shops of the Taylor-Wharton Iron & Steel Company at Easton, Pa. The order was placed through Westinghouse, Church, Kerr & Co., New York.

The Andrews & Hitchcock Iron Company, Youngstown, Ohio, is rebuilding one of its stacks at Hubbard, Ohio. It is not rushing work, and the furnace will probably not be ready for blast before May 15.

The American Spiral Spring & Mfg. Company, Pittsburgh, is making a number of special springs for the battleship Pennsylvania, of extra-heavy section steel. They will be used for the balanced hatch covers on the vessel. The company is also manufacturing a lot of springs for the Rock Island Arsenal, Rock Island, Ill.

Reports that the Youngstown Iron & Steel Company, which contemplates building an open-hearth steel plant at Lowellville, Ohio, had placed contracts for most of the equipment and would be making steel in about three months, are incorrect. This company placed a contract last June with the Fort Pitt Bridge Works, Pittsburgh, for the steel buildings, and work on these is progressing, but no contracts have as yet been placed for the rolling equipment. Julian Kennedy, Pittsburgh, is consulting engineer for the new plant, and all plans have been made under his supervision. It is possible that contracts for the equipment may be placed in the near future, but this is not certain.

Bids are being taken for the erection of the three-story and basement experimental station to be built in Pittsburgh by the United States Bureau of Mines. The building will be 60 x 239 ft., with two wings, each 47 x 211 ft.

The Westinghouse Electric & Mfg. Company has removed the offices of its recently organized automobile equipment department from its main works at East Pittsburgh to Shadyside Station on the Pennsylvania Railroad, Pittsburgh, where they will be located in the building devoted exclusively to the manufacture of Westinghouse automobile equipment. This department was organized January 1, with G. Brewer Griffin as manager in charge.

The population of Youngstown and East Youngstown, according to the 1915 directory just issued, is 110,596. It is estimated that the Mahoning Valley has lost 1000 men owing to industrial conditions since the 1914 census was taken. While sixth in population in the State, Youngstown is rated third in industrial importance, Cleveland and Cincinnati preceding it, according to the State Bureau of Labor Statistics.

Sanderson & Porter, 52 William street, New York, are engineers for the Parkersburg, Marietta & Interurban Railway Company, which will build a 5000-kw. steam turbine plant at Parkersburg, W. Va.

The Erie Stove & Mfg. Company, Erie, Pa., has plans in preparation for a one and three-story factory which it will erect at Twentieth and German streets, at an estimated cost of $100,000.

The Penn Electric Mfg. Company, Erie, Pa., will erect a factory of brick and steel construction to cost approximately $75,000, on a site adjacent to its plant which was destroyed by fire about two months ago. Additional machinery and equipment will be required.

Spelter Exports Compared

The first concern of the domestic user of spelter in the present acute stage of the market has been, naturally, the continuance of his own supply. Immediately back of this anxiety is the interest, for which there appears never before to have been a similar occasion, in knowing how much spelter is actually going abroad. That there is justification for this interest is apparent from a comparison of exports of spelter in 1913 and 1914, beginning with July, following which, in the past year, the unparalleled foreign demand began to be felt. From the Government statement of exports of domestic zinc in the form of pigs, bars, plates and sheets, we take the following figures, converted into gross tons:

	1913	1914
July	355	140
August	3,079	475
September	17,005	51
October	9,160	76
November	11,381	26
December	16,854	61
12 mos. ended Dec. 31	57,770	6,949

Our South American Trade

The Department of Commerce has issued special monthly statement No. 21, showing the value of imports from and exports to certain specified South American countries in the month of December, 1913 and 1914, and in the twelve months ended December, 1913 and 1914, as follows:

Imports

	December		Twelve Months	
	1913	1914	1913	1914
From				
Argentina	$4,569,424	$2,870,991	$25,575,667	$56,274,246
Brazil	14,178,032	9,300,331	100,947,735	95,000,622
Chile	2,486,934	1,655,997	29,553,823	24,238,713
Peru	1,164,345	841,153	10,824,587	11,269,941
Uruguay	176,495	44,619	1,860,609	9,597,168

Exports

To				
Argentina	$4,737,855	$1,521,348	$54,980,415	$27,127,958
Brazil	2,128,097	1,431,998	39,901,203	23,275,894
Chile	1,917,901	295,178	16,616,912	13,627,618
Peru	694,478	552,598	7,608,916	5,876,487
Uruguay	518,886	286,479	7,617,110	4,153,438

At the annual meeting, February 18, the stockholders of the Metallurgic Engineering Company, Chicago, adopted a recommendation of the directors that the name of the company be changed to the Snyder Electric Furnace Company. Proper steps have been taken to put the change of name into effect. It was felt that the old name did not properly describe the company's business and was confusing to the public. No change has occurred in the personnel of the company. The officers are: Frederick T. Snyder, president; Carl H. Booth, vice-president; W. K. Booth, secretary; F. E. Berggren, treasurer. The main office will continue to be located at 53 West Jackson boulevard, Chicago, Ill.

The annual report of Deere & Co., Moline, Ill., and subsidiary companies, for the fiscal year ended October 31, 1914, states that sales in the year declined about 11 per cent. while factory operations decreased 44 per cent., the latter condition being caused by the excess in inventory of 1913. The organization's working capital decreased $577,275 in the year. The net income in the year was $2,085,079, against $4,104,222 in 1913 and $4,365,678 in 1912. There was a deficit of $562,916 in the year as compared with a surplus of $1,456,227 in the fiscal year 1913 and $2,388,808 in 1912.

The La Follette Iron Company, La Follette, Tenn., because of its inability to turn iron in its yards into cash, has been embarrassed to the extent of seeking a receivership, although understood to be solvent. Neil Robinson, Charleston, W. Va., receiver also for the La Follette Coal, Iron & Railway Company, has been appointed receiver.

The Canton Sheet Steel Company, Canton, Ohio, at a recent meeting of its directors, decided to increase its capital stock from $500,000 to $2,000,000. After the increase is ratified at a meeting of its stockholders, March 15, steps will be taken toward a number of plant improvements.

High Blast Heats in Mesaba Practice*

Heat Economies Secured with Higher Blast Temperatures for Melting Mesaba Ores—The Influence of Clean Washed Gas on Stove Capacity

BY WALTER MATHESIUS†

The use of high blast heats on furnaces melting Mesaba ores is still the exception, the average blast temperatures carried on Mesaba stacks seldom reaching 1100 deg. F. Since higher blast temperatures did not seem to offer great advantages in the smelting of Mesaba ores, investments in hot-blast stoves were not as attractive to the furnace man as labor-saving devices and means of obtaining greater tonnages. The effect of this preference is keenly felt at the present time. It has brought about the peculiar situation, that the majority of our furnace plants lack modern and efficient stove equipment. In an endeavor to obtain results, even with inadequate equipment, we find that, at many plants, the stoves are worked far beyond their capacity. This leads, in many instances, to a situation in which the coke saving in the furnace is offset by the losses of heat carried away in the waste gases escaping from the overburdened stoves. Quite frequently, 40 per cent. and more of the total gas production is used in heating the blast, thereby seriously curtailing the amount of gas available for conversion into power. The more efficiently this power is generated, and the greater the demand for it, the higher becomes the value of the furnace gases, and the more necessary it is to economize the gas used in the stoves.

There are furnace plants which have raised their blast temperature to an average of 1000 to 1100 deg. F. and are obtaining very low fuel consumption with Mesaba ores, by means of good furnace lines, suitable coke, correct distribution, and other essentials. In confirmation of this point, during the last year, the blast temperatures at two of the Bessemer furnaces at the South Chicago plant of the Illinois Steel Company were raised above the 1100-deg. line, and for many months temperatures from 1100 to 1300 deg. F. were employed, with the result that the coke consumption was reduced to extraordinarily low figures without causing any operating difficulties. Data from the practice of these furnaces supporting this fact are included in the paper. The problem of adapting furnace lines, raw materials, and operation to the new practice having been proved capable of solution, efficient heat generation, through suitable stove construction and operation, is of paramount interest today.

STOVE CONSTRUCTION

When at an existing furnace plant the use of higher blast temperatures is contemplated, the simplest means is often deemed to be an enlargement of the stove capacity by building an additional stove. This will, of course, increase the available heating surface and produce a higher blast temperature, but not without considerably decreasing the efficiency of the hot-blast equipment. In spite of the several disadvantages, many blast furnace managers have decided that the erection of a fifth stove is the best means of increasing their stove-capacity, for two obvious reasons: (1) because it can often be done with practically no other changes to existing equipment; and (2) because it insures a greater regularity of blast temperature.

For instance, where five stoves are available, it is possible periodically to cool off each unit completely for cleaning the checker work, without any loss of heat to the blast furnace. It is also claimed for this practice that each stove can be cooled without decreasing the blast temperature on the furnace, considerably lower than is otherwise possible; and that thus the heat interchange from gas to checker work and from checker work to blast becomes more active, resulting in lower stack temperatures and better efficiency. That the possibility of periodically cleaning each stove without heat losses to the furnace is a considerable advantage over the old practice is not disputed. Still, the five-stove practice, like any practice with dirty gas, entails the tremendous disadvantage that each stove has to be completely cooled off when its turn for cleaning comes. In many instances these disturbances lead to the actual breaking down of the brick work, and always hasten the final destruction of the lining. Mechanical cleaning, too, injures the stove lining, especially the top checkers and the combustion chamber, where the flue dust carried in with the gas sinters, often melts and fuses with the brick work.

While it appears that having a fifth stove available is beneficial to the furnace practice, in allowing the regular maintenance of higher heats, yet this benefit is gained at the expense of stove efficiency, because the chief evil has not been removed, namely, the accumulation of flue dust in the stove checkers, which constitutes the greatest impediment to efficiency in stove practice. The only way to eliminate this definitely is to prevent the flue dust from entering the stoves, *i.e.*, to wash the gas thoroughly.

GAS WASHING IMPORTANT IN MESABA PRACTICE

In Mesaba practice the washing of the gas is specially important, and it is incomparably more beneficial than in furnaces melting hard ores. This is mainly for two reasons. By reason of the fineness of the ores and the fast rate of driving customary at Mesaba stacks, the amount of flue dust produced is high, and most of it is a very fine powder, which cannot be eliminated from the gas by any existing dust catcher. Hence the clogging of the checker openings proceeds very rapidly in Mesaba practice. On the other hand, the top temperature of Mesaba furnaces being comparatively low, the loss of sensible heat, which always accompanies the washing of the gas, is reduced to a minimum, and is offset many times by the elimination of the water vapor and the resulting concentration of the combustible constituents of the comparatively lean gas.

But while, in Mesaba practice, conditions without exception favor the use of washed gas, there may be considerable room for argument to the contrary in the case of furnaces working on coarser and harder, especially magnetite, ores. The flue dust carried out by the gases from such furnaces

*From a paper presented at the meeting of the American Institute of Mining Engineers, New York City, February 15, 1915.

†With Illinois Steel Company, South Chicago, Ill.

may be small in quantity, and of such a nature as to be easily and sufficiently eliminated in the dust catcher. Furthermore, by reason of the high temperature of the rich top gases, the loss of sensible heat through washing becomes serious, and may eventually justify a decision against the installation of a wet-washing arrangement.

Notwithstanding this exception, it is the use of washed gas which has made possible the construction of stove linings with a view to stability and heat economy only, and without regard to the consideration of stove cleaning, which, if the gas be dirty, must become the prime factor in determining the checker-work construction. The checker openings, which, where unwashed gas is used, are usually 9 in. square, can, with washed gas, readily be reduced to as small a size as the draft will allow. The checker walls, which, with unwashed gas, are not considered safe when less than 3 in. in thickness, can now be reduced to the limit set by the size of checker openings as determined by the proper relation of total brick volume to surface, and by the ability of the brick manufacturer to produce a strong, substantial firebrick. In this way the heating surface of the checker work is increased, for instance, more than 50 per cent. by reducing the checker openings from 9 to 4 in., and the thickness of the checker walls from 3 to 2.5 in. At the same time this construction eliminates the dead portion of the brick work, in the center of the thicker checker walls, which does not participate in the heat exchange. By using washed gas and changing the stove linings along the lines indicated above, any furnace plant can increase the heating capacity of its stove equipment without adding to the radiating surface. In many cases an increase which will fully meet all heat requirements can thus be obtained.

With higher stove temperatures, better insulation of the stove shell gains importance. It can be obtained by making the outer brick walls thicker, and using for them two kinds of brick: a porous kind of highly insulating quality, next to the shell; and, inside of this, a course of common firebrick (except in the combustion chamber, where a lining of highly refractory brick is required). Under no circumstances should the depth of the insulating wall be sacrificed to the desire of increasing the heating surface. To get an idea of the heat saving which can be expected from a better insulation, one has only to consider that in most stove plants the radiation losses amount to fully 20 per cent. of the total heat generated.

If sufficient heating capacity cannot be obtained within shells of a given size, the only remedy is to enlarge them, by increasing either the hight or the diameter. In building new stoves a larger diameter should be chosen; and on existing units an increase in hight is generally feasible and sufficient.

COMBUSTION OF WASHED GAS

In almost all cases where the change has been made from unwashed to washed gas, difficulties have been encountered, due to the slower ignition of the latter. The cold and apparently wet gas would not ignite opposite the gas and air inlets, and the flame would burn only in the upper parts of the combustion chamber and often during its downward passage through the checker openings. Stoves would look dark and cold at the bottom of the combustion chamber, and, in extreme cases, even a large excess of air would not free the stack gases entirely from carbon monoxide.

Where such difficulties have seriously interfered with the operation, and could not be overcome by adapting the stove practice to the new conditions, their cause has generally been either insufficient washing or inadequate drying of the gas.

Both these conditions cannot be remedied at the stoves and will always injure the stove efficiency by increasing the amount of inert gases passing through the stove during the heating period, decreasing the temperature of combustion and raising the amount and temperature of the waste gases, *i.e.*, the stack loss. The place to eliminate these evils is at their source, the gas-washing and drying plant.

However, it cannot be denied that even with satisfactory washing and drying, it is generally more difficult to achieve quick ignition with cold washed gas than with hot gas. This difficulty, due primarily to the loss of sensible heat, becomes more serious with a decreasing percentage of combustibles in the gas. At plants running on regular low-silicon grades of iron, and a low coke rate, such conditions may require special attention, and sometimes special devices. To remedy this evil, various arrangements have been proposed, among them the preheating of the gas or air, or both, by the waste gases, in heat interchangers. Nearly all such remedies require a complicated installation, which is undesirable and, under most conditions, unnecessary. In most cases, a properly constructed burner answering these requirements is all that is needed.

METHODS OF BURNING GAS

Very efficient burners of a modified Bunsen type have recently been introduced, which, without being complicated in design, give an excellent mixture of air and gas. They utilize the method of first mixing primary air and gas outside of the stove before the point of combustion is reached, and then introducing the secondary air in the proportion required for complete combustion. In this manner a high flame temperature is reached, and all of the carbon monoxide is burned with a much smaller excess of air than is possible with the ordinary type of burner. However, where the size of stoves is entirely inadequate, or relining is not possible in the immediate future, a new method of forced combustion is suggested as the proper solution.

This method, originating in Germany, and now being tried at several American plants, consists of blowing air into the gas burner with sufficient force so as to burn the mixture of gas and air under pressure within the stove. This not only insures a quicker combustion, but also causes a much greater volume of gas and air to enter the stove than could be drawn in by the chimney draft alone. It is claimed, and experiments tend to show, that in this manner practically as much heat can be stored in the stove in one hour as can be taken out by the blast in the same length of time. If this claim can be established, it is evident that radiation losses will be greatly reduced, since only two stoves in place of the present four would be required. The cost of installing and operating a fan appears to be a very small item, when compared to the first cost, repairs, and maintenance of two hot-blast stoves.

But the installation of a good stove burner is by no means the cure of all evils. Constant watchfulness on the part of the furnace management and crews is required to keep the three variables, gas, air, and draft, always properly adjusted. The importance of strict supervision cannot be over-estimated. The aim should always be to complete the combustion in the lower part of the chamber; the shorter the flame the higher will be its temperature, and the brighter also the appearance of the

combustion chamber walls, which can readily serve as a guide for the operator. If the combustion chamber is roomy enough to permit a free development of the flame, the danger of overheating and melting the parts of the walls opposite the burner is remote.

DISTRIBUTION OF GASES

Proper combustion having been achieved, the next step is to distribute the gases correctly over the entire heating surface, and to bring them into the closest contact with the brick work, there to give off their heat as uniformly and completely as possible.

To facilitate proper gas distribution, many arrangements have been proposed and applied to the original designs of both side and center-combustion stoves. Most of these devices have achieved but little, so long as unwashed gas was used. The deposition of flue dust on top of the checker work would, in the course of a few weeks, bring gas circulation to a complete standstill in a large percentage of the checker openings. Through the remainder of the openings the gas would flow with increased speed, passing only a small part of the total heating surface with little chance for proper heat exchange, and with correspondingly high stack temperature as a result.

With the introduction of washed gas, this condition is changed completely. The checker work can now be relied upon to retain its original free area throughout a whole furnace campaign, or at least for a number of years. The proper distribution of the gas and the correct regulation of the draft now become a problem of the utmost importance. Researches which have been carried on in recent years seem to indicate that on a large number of stoves the deficiency in this respect is serious, affecting in some cases over 50 per cent. of the total heating surface. Such conditions can now be readily and reliably investigated and adjusted.

ADVANTAGE OF CLEAN CHECKERS

That the heat transmission to and from the brick work is not impaired any longer by a flue-dust coating on the brick surface, is another important benefit derived from the use of washed gas. In the cooler parts of the stove, this coating appeared in the form of a spongy, porous insulating covering, and in the hotter parts, reacted with the brick work to form an iron silicate glaze of low heat conductivity. This danger being eliminated, the ability to withstand such chemical attacks is no longer required for a good stove brick; and the manufacturer can now concentrate his efforts exclusively upon the development of a standard quality, which will combine strength and elasticity with highest heat-storing capacity, conductivity, and infusibility.

Great progress along these lines has been made in recent years through the manufacture of machine-pressed brick, the practical service of which is the most convincing argument against the old idea that a checker work must have pores for retaining the heat, instead of the property of taking up and giving off the heat quickly. Such pressed brick will permit a considerable decrease in thickness of the checker walls, without endangering the building strength of the brick work.

Used in conjunction with smaller checker openings, it will enable us to obtain within a given stove shell the maximum heating surface with the largest brick volume and the highest ratio of active brick surface to total free space. This means the most intimate contact between the brick work and gas or air; and, together with concentrated combustion, correct gas and air distribution and draft regulation, will result in the lowest stack temperatures and highest and most uniform blast heats; that is to say, in efficient stove operation.

HEAT CALCULATIONS

The exceedingly favorable practice which has been obtained recently on Mesaba furnaces by the use of higher heats, lends new and special interest to the theoretical side of the fuel-economy question. Research along these lines so far has not been very extensive in Mesaba practice, and it is to be hoped that the recent practical progress will give a new impulse also to scientific investigations.

Examinations of existing furnace conditions in different localities appear to be of first importance; and as a contribution of this character a thermal analysis has been prepared of the performance of No. 4 blast furnace at the South works of the Illinois Steel Co., during the month of June, 1914.

These data of practice, and the calculations employed for the establishment of the heat balance, are then presented very clearly and in detail in the paper. In these calculations, analysis of the top gases showed 22.3 parts CO_2 and 22.4 parts CO by weight, from which it is derived that each ton of gas carries 0.0608 ton of CO_2 and 0.0960 ton of CO. From the record of the burden as charged, and other simple deductions, the calculation of which is worked out fully, the accompanying tabulation of weights of materials passing through the furnace is obtained.

Heat Balance Sheet for One Ton of Product

Generated — By	B.t.u.	Per cent.
Combustion C to CO	3,995,000	31.1
Combustion C to CO_2	6,754,000	52.6
Hot blast (heat content)	2,057,000	16.0
Moisture of the air in hot blast (heat content)	42,000	0.3
Total	12,848,000	100.0

Consumed — By		B.t.u.	Per cent.
Reduction of Fe_2O_3	6,133,300		
Reduction of Fe_3O_4	490,000		
		6,623,300	
Reduction of MnO		48,400	
Reduction of P_2O_5		17,000	
Reduction of SiO_2		418,500	
		7,107,200	55.3
Calcination of carbonates		702,000	5.5
Dissociation of moisture in blast		397,000	3.1
Carried off with the iron		1,142,500	8.9
Carried off with the slag		909,000	7.1
Carried off with the dry top gases		752,400	5.9
Carried off with the moisture in top gas		700,100	5.4
Radiation, cooling water, and unaccounted for		1,137,800	8.8
Total		12,848,000	100.0

Material	Total tons	Per ton of product, including scrap produced — Tons	Pounds
Burden	31,645	1.827	4,092
Limestone	6,154	0.355	795
Coke	13,006	0.751	1,682
Product (including scrap)	17,319	....	....
Slag	7,811	0.451	1,010
Flue dust	691	0.040	89
Blast (excluding moisture)	51,592	2,979	6,673
Moisture in blast	539	0.031	69
Top gas (excluding moisture)	72,360	4.173	9,359
Moisture in gas	4,665	0.269	603

From the average analysis of the product showing the elements contained and their percentages, and from the record of the oxide combinations in which these elements existed in the charges, together with their respective weights per ton of product, it is shown that the reduction of the oxides entering into one ton of product required 7,107,200 B.t.u. These calculations and a similar consideration of the other factors result in the accompanying heat balance sheet for one ton of product.

McKeesport Tin Plate Company to Expand

The McKeesport Tin Plate Company, McKeesport, Pa., which now has a plant of 22 hot tin mills, has decided to add 20 more. It will then have the largest single tin-plate plant in the world. The company built its first plant in 1902, having 10 mills, and added 12 in 1909. It owns 17 acres, on part of which the present plant is located, and the new mills will be built on the remainder of the site. The new 20 hot mills will each be 28 in. in diameter, and there will be 21 stands of cold mills of three sizes, these being stepped down. These mills will be rope driven, and five new engines, 30 x 60 in., of the Corliss type, with rope drive, will be added, two of the present engines to be dismantled. The company will also install 3000-hp. water-tube boilers, equipped with automatic stokers, also a 600-kw electric generator. There will also be added 20 doubling shears, 20 squaring shears, 20 hand-fired heating furnaces and seven stoker-fired double annealing furnaces. The new crane equipment will consist of nine 20-ton and three 5-ton electric cranes.

A concrete retaining wall will be built along the Youghiogheny River side of the plant, 100 ft. in length. The present trackage system is to be materially changed, and a 150-ton track scale will be installed. A new steel building, 300 x 800 ft., equipped with several crane runways, will be built, which will contain the bar storage house, the sheet and pair furnaces, the hot and cold mills, the annealing furnaces, and the opening and pickling departments. The present warehouse is in line with the tinning department, and part of this warehouse will contain the new tinning department, which will have 30 four-roll tinning sets. A new warehouse, 50 x 400 ft., will be built, and also an addition to the present boiler house to contain the new boilers. About 2500 tons of steel will be used in the new buildings.

At present the company has a capacity of about 1,800,000 boxes of tin plate per year, but the new mills will increase the output to about 3,000,000 boxes per year. S. Diescher & Sons, consulting engineers, Farmers Bank Building, Pittsburgh, who built the original plant in 1902, and made the plans for the mills added in 1912, will make the plans for the new mills and will have entire charge of the construction work.

The capital stock of the company has been increased from $1,200,000 to $3,000,000, bonds to the amount of $1,800,000 having been issued, to bear 5 per cent. interest, and all of which have been sold, mostly to the present stockholders. Work on the new mills will start at an early date, it being the intention to award contracts for the equipment as soon as possible. The officers of the company are: E. P. Crawford, president; E. P. Douglas, vice-president; G. V. Parkins, secretary; W. L. Curry, treasurer; H. M. Clark, auditor and assistant treasurer; J. E. Lauck, general manager, and J. C. Smith, chairman of the executive committee.

Ferroalloys shipped into Italy in 1913 were 106,649 metric tons and in 1912, 94,485 tons, the sources being Austria, France, Germany and Great Britain. In each case Germany contributed the most. Up to August 1, 1914, 57,003 tons had been received, 23,317 tons coming from Austria and 19,605 tons from Great Britain. The total to October 1 was 67,574 tons, only 10,571 tons coming during three months of the war. Of this Austria sent 1307 tons, France 3 tons, Germany 2652 tons and Great Britain 6102 tons.

Youngstown Sheet & Tube Plans

The Youngstown Sheet & Tube Company, Youngstown, Ohio, has made tentative plans for large additions to its extensive works. The additions contemplated are as follows: Two merchant bar mills; one sheared plate mill to supplement the universal plate mill now used chiefly for the manufacture of skelp in large sizes; additional sheet mills; four jobbing mills for heavy sheets; hot mills for the manufacture of tin plate; possibly some minor units. These proposed additions would take care of about 25,000 tons per month of semi-finished product, such as sheet bars, billets, slabs and ingots. With these mills added to its present plant the company would be able to finish all its own product for market.

In addition, the company has decided to erect a battery of by-product coke ovens. These ovens will be erected with a view to producing approximately 50,000 tons of coke per month. They will be erected east of the rod mills at Struthers, Ohio, and will be of the latest design and equipment.

It is likely that the first new work to be done will be the building of the by-product coke ovens. Engineers have been at work on the plans for the new finishing mills above enumerated for more than a year, but no time has been set for their erection, and it is not likely that they will be started this year.

Wheeling Steel & Iron Company's Year

The annual meeting of stockholders of the Wheeling Steel & Iron Company was held in Wheeling, W. Va., last week. Isaac M. Scott, president, submitted a report of the operations of the company for the year ended December 31, 1914, which showed that net profits for the year were $278,266.80, or about 4½ per cent. on the capital stock of the company. Payrolls for the year aggregated $1,750,000. Dividends paid aggregated $361,678, as against $399,632 in 1913. The surplus is $2,370,414. The average production of the company's plants for the year was about 25 per cent. less than in 1913, or about 65 per cent. of the capacity. The stockholders re-elected the board of directors, as follows: E. W. Oglebay, C. R. Hubbard, H. Hornbrook, W. A. Isett, William F. Stifel, George E. Stifel, Edward Hazlett, B. W. Peterson, J. J. Holloway, Robert Hazlett, E. C. Ewing, F. W. Henderson and I. M. Scott.

As already noted in these columns, a project has been under way for some time to consolidate the interests of the Wheeling Steel & Iron Company and the LaBelle Iron Works of Steubenville, Ohio. No report was made on this matter. It is very uncertain as to whether the project will go through.

At the second monthly dinner and educational meeting held by the employees of the Cleveland Crane & Engineering Company, Wickliffe, Ohio, February 18, A. G. Wicks, safety engineer for the American Steel & Wire Company, gave an interesting and instructive lecture illustrated with stereopticon views showing the safety first and welfare work of the United States Steel Corporation. Among the pictures shown was one of particular interest, illustrating two Cleveland cranes, which the speaker said were the first cranes installed by the corporation fully equipped with every modern safety feature. Five prizes were awarded to the workmen of the plant for suggestions made during the month that could be put to practical use by the company. The suggestion contest will be continued for six months.

A new process for detinning has been discovered by Wallace Savage, who states that at a temperature below 68 deg. F. and preferably at 32 deg. F., a coating of white tin can be changed to the non-adherent gray tin by the catalytic action of gray tin when applied in the form of a slimy mixture with a solution of tin ammonium chloride. The mixture recommended is about 2500 lb. of gray tin with a solution of 10 lb. of tin ammonium chloride in 100 gallons of water. The coated material may be moved through the slime or agitation may be employed.

OBITUARY

H. WARD LEONARD, inventor of the Ward Leonard system of electrically driving rolling mills, mine hoists and elevators, died of apoplexy on the evening of February 18 at the Hotel Astor, New York, as he was about to participate in the annual dinner of the American Institute of Electrical Engineers, of which he was a director. He was born at Cincinnati, Ohio, February 8, 1861, and was graduated in 1883 at the Massachusetts Institute of Technology. In 1884 he became one of Thomas A. Edison's personal staff of four engineers to introduce the Edison central-station system. In 1887 he was made general superintendent of the Western Electric Light Company at Chicago, and in 1888 and 1889 he was senior partner of Leonard & Izard, at Chicago, a firm which installed central-station plants and electric railroads in various parts of the United States. The firm being bought out by the parent Edison interests, Mr. Leonard became general manager of the light and power department of these interests for the United States and Canada, with headquarters in New York City. In 1891 he resigned to establish his own independent manufacturing business, which is still operating as the Ward Leonard Electric Company at Bronxville, N. Y. Mr. Leonard had devoted himself principally to experimental work and the patenting of his inventions, aggregating in all more than 100. They included gasoline-electric trucks, transmission gearing for motor cars, and automatic electric lighting systems for railroad trains and motor cars. He was probably the first engineer seriously to advocate high-tension single-phase traction for heavy railway work.

ARTHUR KEEN, distinguished among steel manufacturers of Great Britain, is dead. Mr. Keen attained his prominent place in British industry not so much by reason of a knowledge of manufacture, although he was widely known as a manufacturer, but by virtue of his eminent ability as a business organizer. Associating himself with an American of inventive genius, a Mr. Watkins, under the name of Watkins & Keen, a business was developed in the manufacture of nuts and bolts which subsequently became the Patent Nut & Bolt Company. By a series of amalgamations, extending over a period of years, with this company as the foundation, Mr. Keen through his exceptional capacity for grasping the problems of business and his energy brought together the firm of Guest, Keen & Nettlefolds, Ltd., of whose executive board he was chairman. This company and its predecessors had acquired extensive coal mines and mills in Wales and the capital thus represented aggregated £5,000,000. Arthur Keen took an active interest in the politics of Great Britain and was a leader of the Liberal party. He was also vice-president of the Iron and Steel Institute and of the Institute of Mechanical Engineers.

JED O. GOULD, general superintendent of the works of the Gould Coupler Company, Depew, N. Y., died February 19 in a Buffalo hospital, aged 57 years. He was a brother of Charles A. Gould of New York City, president of the company. He leaves his widow and three sons.

THOMAS LYNCH, a retired manufacturer of gas engines, died February 16 at his home, Bay Ridge, Brooklyn, N. Y., aged 72 years. He was a native of England, but had been a resident of Brooklyn for 40 years.

WILLIAM F. GURLEY, manufacturer of surveying instruments, Troy, N. Y., died in Atlantic City, N. J., February 18, aged 55 years.

BERNARD MCLAUGHLIN, of the Craig Foundry Company, Brooklyn, N. Y., died February 14, aged 54 years.

Foreign-built vessels admitted to American registry up to February 19, 1915, have numbered 129, with 468,509 gross tons.

Trade Commission Nominated

WASHINGTON, D. C., February 23, 1915.—The President has nominated for members of the Federal Trade Commission Joseph E. Davies, of Wisconsin; Edward N. Hurley, of Illinois; William J. Harris, of Georgia; William H. Parry, of Seattle, Wash., and George Rublee, of Cornish, N. H. At the last moment, Mr. Rublee was substituted for George L. Record, of New Jersey, whose selection, foreshadowed some time ago, was the subject of numerous protests based upon his advanced views on certain economic questions. In forwarding these nominations to the Senate, the Administration gave out certain data with regard to the candidates in part as follows:

Joseph Edward Davies, Madison, Wis., born in 1876, is a graduate of the University of Wisconsin and was admitted to the bar in 1901. He practiced law until 1913, when he was appointed Commissioner of Corporations. This bureau will be absorbed in the commission and it is understood that Mr. Davies, who is nominated for the seven year term, will be chairman.

Edward Nash Hurley, Chicago, was born in 1864, and was educated in the public schools. He was employed as engineer on the Burlington Railroad up to 1888, when he became a traveling salesman and later manager of the United States Metallic Packing Company. He afterward became identified with the pneumatic tool industry and was organizer, president and treasurer of the Standard Pneumatic Tool Company, Chicago. Disposing of his interests in that company, he engaged for six years in farming and stock raising and in 1913 was appointed by the Secretary of Commerce as a trade commissioner to the Latin-American republics.

William Julius Harris, of Georgia, was born in 1868, was graduated from the University of Georgia and has been engaged in the fire insurance business in Atlanta and Cedartown, Ga. He was appointed Director of the Census in July, 1913.

William H. Parry, Seattle, Wash., was born in 1865, and was graduated from Columbia University, New York City. He later engaged in newspaper work, becoming editor of the Seattle Post Intelligencer. In addition, he is managing a shipbuilding plant on the Pacific coast and is treasurer of the city of Seattle.

George Rublee, Cornish, N. H., was born in 1862, is a graduate of Harvard and practiced law until 1913, when he retired and has since given his attention mainly to economic questions. During the last year he was a member of the special committee of the United States Chamber of Commerce on trust legislation.

The law creating the Federal Trade Commission requires that not more than three members of the commission shall be of any one political party. Mr. Davies, Mr. Hurley and Mr. Harris are Democrats; Mr. Rublee is of the Progressive party, and Mr. Parry, while of the Republican party, is more generally understood to have Progressive inclinations. W. L. C.

The Illinois Malleable Iron Company, Chicago, held its annual meeting February 13 at which the following officers were elected: President, Henry E. Bullock; vice-president and treasurer, James E. Bullock; secretary, William J. Akin. These, with C. F. Drozeski and J. R. Steneck, constitute the directorate. The customary financial report showed the results of the year's operations to have been profitable, notwithstanding the unfavorable conditions. Out of the year's earnings was declared the usual dividend, while a substantial balance was carried to surplus account.

The Lea-Courtenay Company, 90 West street, New York, announces that increased business makes it advisable to establish its own Chicago branch for the sale of its high duty turbine pumping machinery. This line has been handled in Chicago territory for several years by the Maher & Byrne Company, Otis Building. Mr. Maher resigned from the latter company January 1 and now becomes associated with the Lea-Courtenay Company as its Chicago manager, with offices in the Conway Building.

PERSONAL

W. L. Saunders, President Mining Engineers

The election of William L. Saunders to the presidency of the American Institute of Mining Engineers, which occurred February 16, invites attention to his active career and the varied fields in which he has rendered signal service. Civics and public welfare, as well as engineering, manufacturing and commerce, have benefited from his ability to grasp the broader scope of affairs and his willingness to give freely of his talent to help solve the problems of the day. It has been said of him that with all the pressure on his time he never fails to give ear in a friendly, democratic manner to those who approach him on worthy matters, and that his faculty of handling people is in accord with the

WILLIAM L. SAUNDERS

force he uses not only in imparting good to things, but in laying bare the good already in them.

Mr. Saunders was born November 1, 1856, at Columbus, Ga., the son of William Trebell Saunders, D.D., of Norfolk, Va., and Eliza Morton Saunders. He is a nephew of Robert Saunders, who was president of William and Mary College, Williamsburg, Va. He graduated from the University of Pennsylvania with the degree of B.S. in 1876, and from the same university received the degree of Sc.D. in 1911. In 1878 he was engineer for the National Storage Company, New York harbor. Later he was in charge of the hydrographic work in connection with the building of the ship canal from the New York main channel to Black Tom Island on the New Jersey shore. In 1881 he became engineer for the Ingersoll Rock Drill Company and later secretary, vice-president and president of the Ingersoll-Sergeant Drill Company. He was formerly president and is now chairman of the board of directors of Ingersoll Rand Company. Others of his connections include the following: President and director of the Rand Drill Company and director of the A. S. Cameron Steam Pump Works, Edison-Saunders Compressed Air Company, International Harvester Company of New Jersey, International Harvester Corporation, Milliken Bros., Inc., and Peoples' National Bank of Westfield, N. J. He invented apparatus for drilling rock under water and the Ingersoll track and bar channelers and gadders for quarrying stone.

Mr. Saunders was twice elected mayor of North Plainfield, N. J., and is a member of the New Jersey Harbor Commission, to which post he was appointed by President Woodrow Wilson. He is president of the Machinery Club of the City of New York, a director of India House, New York, and a member of the Engineers' and Aero clubs of New York. He is the author of several books and pamphlets on the application of compressed air to mining and rock drilling and has also written on governmental and business subjects. In 1886 he married, at Narragansett Pier, R. I., Bertha Louise Gaston, who died in 1906.

Eivind Erichsen, M.E., who has been engaged by the Allied Machinery Company of America, 55 Wall street, New York, as its Russian representative, will sail, en route to Petrograd, February 27.

William H. Hart has retired from the presidency of the Stanley Works, New Britain, Conn., and has been made chairman of the board of directors, a new office created at the annual meeting of the stockholders. His son, George P. Hart, for 12 years vice-president, has been elected president; E. Allen Moore, vice-president; L. Hoyt Pease, treasurer; H. B. Humason, secretary, and Walter P. Hart, assistant secretary.

Bradlee Van Brunt, advertising manager of the Bucyrus Company, South Milwaukee, Wis., was the principal speaker at the monthly dinner of the Advertisers' Club of Milwaukee February 16, his subject being, "The Use of the Trade Press by the Manufacturer of Contractors' Equipment." The address was illustrated with stereopticon views of Bucyrus equipment in use on the Panama Canal.

J. M. Jones, general manager of the Massillon Rolling Mill Company, Massillon, Ohio, has been elected vice-president of the company.

Alfred C. Nelson, formerly with Arthur G. McKee, engineer, Cleveland, Ohio, has opened offices at 418 Rockefeller Building, Cleveland, as a consulting and contracting engineer.

W. A. Millspaugh has resigned as president of the Sandusky Foundry & Machine Company, Sandusky, Ohio, and J. J. Dauch has been elected in his place. Other officers elected are William F. Harbrecht, vice-president; J. P. Jeffers, secretary.

Charles M. Gunn, long identified with the iron and steel trade of the Pacific coast, has been placed in charge of the pig iron, ferroalloy and coke department of Woods, Huddart & Gunn, 444 Market street, San Francisco, Cal., to handle the products of Crocker Brothers.

Lawrence Addicks, superintendent of the United States Metals Refining Company, Chrome, N. J., has been nominated for president of the American Electrochemical Society, which will hold its annual meeting in Atlantic City, April 22.

Hickman, Williams & Co. announce that Day Williams, their resident manager at Birmingham, Ala., has been transferred to Cincinnati as resident manager of the Cincinnati office. C. M. Day, formerly with the St. Louis office, has been transferred to Birmingham as resident manager of that office. Richmond Nicholas has been appointed resident manager of the Chicago office. T. A. Arthur has been appointed resident manager of the Pittsburgh office. The Chicago office has recently moved from the old headquarters in the Rookery Building to 1701 McCormick Building.

At the recent annual meeting of the stockholders of the Abram Cox Stove Company, Philadelphia, Pa., Robert A. Patton was elected president, succeeding Abram C. Mott, who had occupied that office for many years. Mr. Mott is sojourning in Florida, enjoying his relief from business cares.

J. D. Kaufman, who was formerly sales manager of the service department of the American Die & Tool Company, has been appointed sales manager of the Service Gear & Machine Company, Reading, Pa.

John D. Miller, formerly with the Wheeling Mold & Foundry Company, Wheeling, W. Va., has resigned to become general manager of the Edward Mahar's Sons Company, Newark, N. J.

W. S. Thomas, treasurer of the Wagner Electric Mfg. Company, St. Louis, has been elected a vice-president of that company also.

Employees' Injuries and What They Cost

How Courts Assess Damages for Personal Injuries—Items for Which Recovery May Be Made — Excessive Damages Defined

BY ARTHUR L. H. STREET

When it has been determined that injury or death of an employee was caused by some careless act imputable to his employer the question arises: How much money may the employer be legally required to pay?

If the case falls within one of the workmen's compensation acts, usually the answer may be readily given, inasmuch as they provide a standard for computing awards for specific injuries based upon a certain percentage of the injured workman's wages for a fixed period of time.

But if the claim be presented in a lawsuit it is beyond the scope of human power to do more than conjecture what allowance will be made by the jury and sustained by a reviewing court. The principal reason for this uncertainty lies in the impossibility of determining how many dollars and cents will compensate an employee for pain suffered in consequence of a particular accident and what exact pecuniary loss follows deprivation of the sight of an eye or use of a limb. But the law is plain as to the items for which recovery may be had. In non-fatal accident cases these items include reimbursement for the reasonable cost of medical or surgical attendance, nursing, medicines, etc.; indemnity for earnings lost, and to be lost, as a natural consequence of the accident, and compensation for mental and physical suffering endured as a direct result of the accident.

The amount recoverable for medical attention, etc., is determined by the reasonableness of the charge for the services rendered and not by any larger amount which may have been exacted or paid.

COMPENSATION FOR LOST EARNINGS

An award of compensation for lost earnings involves the drawing of a line between the loss accruing up to the time of the trial and prospective loss arising from any diminished earning capacity. Ordinarily, the wages which an injured workman would have received during the time he was incapacitated for work by injury complained of, measures the recovery for past lost earnings. The principal bases for estimating diminution of future earning power are afforded by a consideration of the injured man's wages before and after the accident, in the light of his life expectancy as shown by standard mortality tables. Then the amount of his prospective loss of earnings for the remainder of his life time must be reduced to the amount which would purchase an annuity. A jury is not permitted to speculate very much on the possibility of the claimant having been able to have entered upon more lucrative employment except for the accident, but there are court decisions which permit consideration of reasonable prospects for advancement.

The judicial authorities do not attempt to lay down any standard for computing damages to be allowed for past and prospective mental and physical suffering. The jury is left in each case to determine what constitutes reasonable recompense, and usually the amount fixed will not be disturbed by a reviewing judge, unless there be some indication that the verdict was influenced by passion or prejudice.

An important qualification governing the assessment of damages for loss of time and suffering forbids recovery so far as the injured person could reasonably have averted an aggravation of the injury. For instance, if blood poisoning should be suffered by an employee in consequence of an injury for which his employer is responsible, the right to recover damages on account of that disease depends upon whether the employee used a reasonable degree of care to avoid infection.

RIGHT OF SURVIVING RELATIVES TO RECOVER

The right of surviving relatives to recover damages for the loss sustained by them, as a result of the death of one upon whom they were partly or wholly dependent for support, is almost purely statutory. In a few States, including New York and Pennsylvania, the amounts recoverable are limited only by the relatives' pecuniary loss, but in many other States the amount is limited to a certain sum, ranging from $4000 in Massachusetts to $10,000 in several States, including Illinois, Indiana, Kansas, Missouri, Ohio, Virginia, West Virginia and Wisconsin.

In case of fatal injury of a workman, his widow and minor children are entitled, within statutory limits, to recover such sum as will compensate them for the amount which he would have probably contributed to their support and education during the remainder of his natural life. For a child to recover for loss of prospective pecuniary aid from the father after the child's minority, it must be shown that there was a reasonable expectation of such aid. The loss of his society in the family may also be considered, but as a general rule there can be no recovery for mental suffering of the surviving relatives on account of his death.

Under the workmen's compensation acts, awards for death or injury are so restricted that, in but few instances, could more than $4000 be allowed, and in most cases awards for death must be even less than this with, of course, still smaller allowances for temporary injuries, which usually are not subject to compensation at all unless they continue for two weeks.

DAMAGES CONSIDERED EXCESSIVE

In suits at law to recover for personal injuries, a judgment awarded two or three years ago in California for about $90,000 seems to be the largest ever approved by the courts, and in the meantime several verdicts in other States have been upheld that allowed from $20,000 to $30,000 damages. But in all these cases it appeared that the injured persons were left hopeless cripples. Recoveries for loss of eyes or impairment of vision, such as is usually sustained by an employee through flying particles of steel, have ranged from $9000 down. Several courts have upheld verdicts ranging from $2000 to $8000 for loss of an arm or hand. Disablement of all of the fingers of a hand has been frequently regarded as an equivalent to a loss of the hand, so far as concerns the assessment of dam-

ages. But in one case, at least, it was held by a New York court that where a mechanic who had earned $850 a year, lost the use of his right arm, $10,000 was not excessive recovery. In one Minnesota case an employee recovered $1800 for loss of two fingers, and in another suit in the same State another workman recovered $4000 for the loss of three fingers. But the following awards have been declared to be clearly excessive: $15,000 for fracture of a leg, $12,000 for loss of a foot, $3500 for permanent lameness, $10,000 for loss of a hand, $5000 for temporary partial loss of sight, $37,500 for total blindness, $5000 for loss of two fingers, $2000 for loss of a thumb and $6500 for loss of a thumb and forefinger.

STERILIZING CUTTING OILS

Suggestion of a Practice to Minimize Blood Poisoning in Machine Shops.

BY P. J. ARTALE

The inauguration of the organized safety movement in the shops of this country is within the brief memory of even the youthful mechanic in the shop today and the results thereby accomplished have been incalculable. Those in search of tangible evidence as to the reduction in industrial accidents since the institution of the safety movement need only apply to the numerous safety associations which have been the outgrowth of this movement.

There is one phase of this work, however, that does not seem to have received the attention generally it deserves. This is the sanitation side of industrial life and it is hoped that the recent announcement of the plans of the health department of the City of New York will cause a general awakening in this direction. The plan announced provides for a sanitary inspection of every factory and workshop in the city. As a result of such inspection by trained sanitarians it is expected that the employers and employees will be furnished with a survey of conditions that will enable both to take intelligent steps in formulating sanitary industrial standards for the prevention of occupational diseases.

From a broad viewpoint the problem of occupational diseases has been attacked and such industries as the lead, paint, polishing and others with which occupational diseases are immediately connected have received considerable attention in this direction. There are fields of industrial activity, however, in which there are no general occupational diseases and it is to these that the neglect from the sanitary side has been most apparent.

POISONING FROM INFECTED CUTTING COMPOUNDS

As an illustration of the far-reaching effect of the lack of proper sanitary precautions the recent testimony of a liability insurance representative will be interesting. The claims for compensation in machine shops, based on cases of blood-poisoning, were by no means infrequent, and many of them resulted in the amputation of fingers, hands and arms, to say nothing of death cases. In an investigation to determine the causes for what was considered an abnormal percentage of blood-poisoning, many cases of original infection were traced to small cuts or bruises commonly sustained in the process of cutting metal on the various types of machine tools. In themselves the cuts were minor and often neglected or simply bound up with a piece of rag. While no degree of accuracy could be reached in the relative causes for subsequent infection it was readily determined that one common cause for infection was the condition of cutting oils and cutting compounds.

In practically all shops cutting oils and compounds are reclaimed over and over again. No stretch of the imagination is required to conceive of the germ-laden condition of such compounds after the exposure and contact incident to turning operations. The result of such reclaimed emulsions coming in contact with cuts and bruises suggests infection.

A simple expedient at once becomes apparent. Why should not such reclaimed emulsions be sterilized before use? The process of sterilization can be carried on in a number of ways and becomes as simple a matter as sterilizing milk at home. This sterilizing process has now been installed in a number of plants and the results have shown a marked decrease in infection cases.

The sterilization of re-used cutting compounds is an example of what can be accomplished in this direction and there is no doubt that with a vigorous agitation such as the accident prevention movement developed, the results of better industrial sanitation will gradually win recognition as an important element too long neglected.

Liquid Fuel for Cupolas

Bradley Stoughton, of New York City, secretary of the American Institute of Mining Engineers, has taken out a patent (U. S. 1,117,274—November 17, 1914) for a process of generating heat applicable in particular to the melting of metals or the smelting of ores. Liquid fuel is the agent recommended to supply all or nearly all of the heat necessary, rendering possible the use of a minimum quantity of solid fuel. The role of the solid fuel present is to ignite and insure the complete combustion of the fluid fuel without waste, sufficient air being admitted to aid in accomplishing this. The process is claimed to be especially applicable to shaft furnaces and some forms of reverberatory ones. The air may be in the condition of a heated blast and steam may be used for atomizing the oil. A thin bed of coke is placed on the bottom of the furnace and on this a layer of ore or metal, then a layer of coke, etc. After the ignition of the bed of coke, the oil is injected into the incandescent mass with enough air to insure combustion of the oil and incandescence of the coke.

More hydroelectric energy generated along the Canadian international boundary is exported to the United States than is used in Canada, according to a report issued by the Dominion government. The total production of electric energy in 1913 by Canadian companies with lines extending into the United States was 1,543,464,097 kw-hr, of which 772,597,049 kw-hr was exported and 770,867,048 kw-hr was used in Canada. The largest exporter was the Canadian Niagara Power Company, which sent to the United States 400,214,908 kw-hr and 11,420,020 kw-hr to Canada. These figures do not include the energy generated near Montreal, Toronto, Quebec and Winnipeg.

At the annual meeting of the Wellman-Seaver-Morgan Company, Cleveland, Ohio, held a few days ago, the old officers were re-elected as follows: President and general manager, W. N. Sawyer; vice-presidents, S. H. Pitkin and George H. Hulett; secretary and treasurer, W. H. Cowell. It is stated that the company's plant operations averaged about 65 per cent. during 1914.

Duties collected at United States custom houses were $18,883,252 in 1821, $229,360,771 in 1900, and $283,719,081 in 1914.

Total deliveries of the Austrian Steel Syndicate for 1914 were 537,000 metric tons, or 12.6 per cent. less than in 1913.

California's crude-oil production in 1914 was 103,623,695 bbl., against 97,867,148 bbl. in 1913.

Machinery Markets and News of the Works

The abnormal demand for lathes for the manufacture of war supplies has now been so long sustained that the anticipated swamping of the trade has set in. In New York the outstanding feature is the scarcity of machine tools with which to fill approaching deliveries. Turret lathes, required both here and in Europe for the manufacture of shrapnel, are practically unobtainable. Engine lathes are correspondingly scarce. Orders are being refused; and in other cases delivery is possible only after six months. Cargo space is becoming harder to get every day. So universal is the export demand that it is drawing on territory as far west as Milwaukee and St. Louis. Domestic requirements are keeping pace with the steady, even improvement of business all over the country; but they are still below normal. In New England encouraging reports come from all metal-working lines. Cleveland reports the buying of many second-hand lathes for shipment to Europe. Purchases of machine tools and other factory equipment in Chicago surpassed in value any previous week of the year. Some large orders for European buyers were also placed. The gradual increase of payrolls in machine shops in the Milwaukee district reflects the betterment there. The situation in Cincinnati has been characteristic of conditions there for some time. Lathe manufacturers are rushed to the extent that they are turning away business; because it requires an unhealthy development of their business, or cannot be met. Makers of shaping, radial drilling and planing machines, on the other hand, have little to do. In Louisville and throughout the South business is everywhere benefiting from the better domestic trade. The opening of the Panama-Pacific Exposition at San Francisco has temporarily retarded business locally; but the prospect of the visiting multitudes of people has created heavy buying of many special lines of machinery. The entire Pacific coast region shows its usual business in small orders.

New York

NEW YORK, February 23, 1915.

A difficulty which now confronts some branches of the machine-tool trade is the scarcity of machines with which to make deliveries now or for several months to come. This is true particularly of turret lathes, which have been in such great demand both in Europe and America for the manufacture of shrapnel cases. Engine lathes, of course, are correspondingly scarce. It is reported of one manufacturer that, having taken orders for several hundred of his machines for export, he was obliged to decline an order for almost 50 machines for domestic delivery. Another maker cannot consider beginning deliveries on a large inquiry now pending before July, and its completion cannot be effected until October. The situation with regard to cargo space in transatlantic steamers is growing worse, also, and the operations of shippers are greatly hampered. At times they have secured space and the machines failed to arrive and at other times the machines were on hand, but the cargo space could not be had. Shipments to Russia are being made by way of the Pacific and Vladivostock.

Alexander Rosin, of Petrograd, who purchased recently machine tools to the value of at least $100,000, left New York February 19 and will sail on the steamer Manchuria from San Francisco, February 27.

Dealers find no break in the upward trend of domestic business in this territory. Strictly local inquiries are fairly numerous and some very good sales have been made to various manufacturers in the western part of New York State. A maker of automobile parts in the south central part of the State has not yet closed against an inquiry for about $150,000 worth of tools. Altogether February has taken its place as a good month and a pleasing part of it is that a good share of the business has been obtained without much effort.

The Newport News Shipbuilding & Dry Dock Company, Newport News, Va., is reported in the market for a few machine tools, and is understood to have placed an order for a large boring mill. In view of the busy state of practically all of the shipyards on the Atlantic seaboard which have orders on hand that will keep them running full for two or more years, they may be expected to become more liberal purchasers.

Bids will be taken the latter part of March for a sewage disposal plant and system for Huntington, L. I., N. Y., to cost about $90,000. S. E. Sammis is town clerk and George W. Fuller, 170 Broadway, New York, is the consulting engineer.

An item in *The Iron Age* of February 18, regarding the completion of plans for the construction of a manufacturing building at Kingston, N. Y., for the Wemlinger Steel Piling Company, 11 Broadway, New York, is incorrect. The company had planned some months ago for the construction of a building along these lines; but the project is held up indefinitely, and the estimated cost will probably not be large.

The reported addition to the plant of the Rome Wire Company, Rome, N. Y., will call for only a small amount of specially designed machinery, most of which will be manufactured in its own machine shop.

The MacArthur Concrete Pile & Foundation Company, 11 Pine street, New York City, has been awarded the contract for the foundation of the pan house and an extension to the boiler house at the plant of the Paterson Parchment Paper Company, Passaic, N. J. W. W. Christie, 140 Market street, Paterson, N. J., is the engineer.

The Dirigo Mfg. Company, Times Building, New York, recently incorporated, is manufacturing tableware, jewelry, novelties, etc. It proposes to eventually acquire a factory and to manufacture its special metal from the base product to the finish. This will require a casting shop, rolling mill and other necessary equipment. W. A. Venter is general manager.

The Estate of John Colyer, 504 Central avenue, Newark, N. J., has purchased property at 399-407 Halsey street, Newark, on which it will erect a factory for the manufacture of automobile bodies, carriages, etc., and will lease it to J. Colyer & Co., 405 Central avenue, Newark, carriage manufacturers.

The Squaw Island Development Corporation has been incorporated with a capital stock of $100,000 to develop industrially Squaw Island in the Niagara River and Black Rock Harbor, Buffalo, at the International Bridge crossing. It plans to build docks, warehouses, mills, factories, etc., for renting, and to construct railroad connections. Daniel E. Knowlton, president of the Knowlton Warehouse Company, and of the Buffalo Cold Storage Company, is president of the new company, and David H. Burrell, Little Falls, N. Y., vice-president.

The Cayuga Lake Cement Company, Ithaca, N. Y., has completed arrangements for the enlargement of its plant to 2000 bbl. daily capacity from plans of the J. G. White Engineering Company, 43 Exchange Place, New York City.

The Lancaster Paper Company, Watertown, N. Y., has been incorporated with a capital stock of $25,000 to manufacture paper, etc., by H. H. Babcock, K. L. Ball, Watertown, and A. I. Ball, Carthage.

The Electric Furnace Products Company, Niagara Falls, N. Y., a subsidiary of the Union Carbide Company, Niagara Falls, will establish a branch plant at Saude, Norway.

Plans have been completed for a sewage disposal system at Briarcliff Manor, N. Y., by Clyde E. Potts, engineer, 30 Church street, New York City, at an estimated cost of $60,000.

The Consolidated Electric Company, Greenwich, N. Y., has increased its capital stock from $75,000 to $150,000.

The Adirondack Motor Car Company, Hudson Falls, N. Y., has increased its capital stock from $10,000 to $100,000.

The International Railway Company, Buffalo, contemplates the erection the coming summer of a power station, substation and shops at Buffalo to cost approximately $150,000.

The wood-working plant of the Braman Mfg. Company, West Carthage, N. Y., was badly damaged by fire last week.

Bids are being taken until March 3 by the municipal board, Lyons, N. Y., H. F. Zimmerlin, clerk, for the construction of a sewage disposal plant and sewerage system at an estimated cost of $91,000. J. F. Witmer & Co., engineers, Dun Building, Buffalo, have prepared plans. The municipal board will also expend about $97,000 upon its waterworks system, including the building of a new pumping station and filter plant. Plans have been prepared.

James F. Leahy, 411 John street, Utica, N. Y., is having plans prepared for a powerhouse, 50 x 70 ft., one story, for his new laundry, to cost complete $50,000. Charles Kiehm, Gardner Block, Utica, is the engineer.

Charles C. Hopkins, engineer, Cutler Building, Rochester, has completed plans for a waterworks system at Barker, N. Y., for which bids will soon be asked.

New England

BOSTON, MASS., February 23, 1915.

The business situation in New England remains practically unchanged. If conditions have altered at all they are improved. It is significant that most manufacturing plants operated on Washington's Birthday, a legal holiday. The day was one which naturally would have been made an idle day had business been really dull and without promise. On every side one hears words of encouragement. For example, one of the greatest of the cotton manufacturing interests reports improvement in the volume of orders, and especially a better general tone of the market. One of the independent wire companies is employing more men than at any time in its history, and the tendency of wire prices is stronger, according to the experience of this territory.

Encouraging reports are received from some of the manufacturers of screw machine products, nuts, bolts and similar lines. This improvement is more or less general, but some firms appear to be more fortunate than others in securing current business.

The machine-tool dealers of New England are not finding a normal demand among their customers, but they see some improvement. This applies as well to the supply trade.

Regarding the machinery trade as a whole, the demand is more general than it has been. Orders are coming to the builders from a wider range of customers. Such is also the case with a wide variety of industries.

The Brown & Sharpe Mfg. Company, Providence, R. I., has awarded the contract for the enlargement of its No. 5 building. The structure at present is 49 x 146 ft., two stories. Four additional stories will be built to bring the building up to the average hight of the plant.

The National Folding Box & Paper Company, New Haven, Conn., has awarded the contract for the additional building already reported. It will be 100 x 350 ft., five stories and basement, of brick, concrete and steel, fireproof construction.

The Bantam Anti-Friction Company, Bantam, Conn., is contemplating an addition to its factory, of brick and concrete, fireproof construction.

Harvey Hubbell, Inc., Bridgeport, Conn., has begun the erection of a large addition to its factory. The new section will be devoted to the manufacture of machine screws.

Plans are being prepared for the addition to the plant of the Pilling Brass Company, Waterbury, Conn. The building will be of brick, 50 x 70 ft., one story and basement.

F. W. Stuart, Beverly, Mass., has plans for a last-making factory.

The Sanford Riley Stoker Company, Ltd., Worcester, Mass., has recently sold stoker installations as follows: Boston Elevated Railway Company, Millville Mfg. Company, Millville, N. J.; International Railway Company, Buffalo, N. Y.; the Carter White Lead Company, West Pullman, Ill.; Hartford Electric Light Company, Hartford, Conn.; the Massachusetts Institute of Technology, Cambridge, Mass., and Hood Rubber Company, Watertown, Mass.

Philadelphia

PHILADELPHIA, PA., February 23, 1915.

The McArthur Concrete Pile & Foundation Company, 11 Pine street, New York City, has been awarded the contract covering the concrete pile foundation for a coke bin and coal unloading pocket at the plant of the Philadelphia Suburban Gas & Electric Company, Chester, Pa. R. C. Cornish is the engineer in charge of the work.

The Southwark Foundry & Machine Company, Fifth street and Washington avenue, Philadelphia, Pa., has awarded the contract for the construction of a one-story steel storage warehouse, 31 x 70 ft., to be erected at Fourth street and Washington avenue, at a cost of about $5000.

Anna H. Thomas, 305 South Fifty-first street, Philadelphia, Pa., has had plans drawn for an addition to the garage at Fifty-first and Spruce streets. It will be one story, 71 x 108 ft., of brick construction, and will cost about $4500. B. F. Thomas, 305 South Fifty-first street, Philadelphia, is the contractor.

The Acme Moving Picture Producing Company, Pleasantville, N. J., has been recently incorporated with a capital stock of $100,000. J. V. Mathis, Bartlett Building, Atlantic City, N. J., is taking bids for a hollow tile and concrete factory and studio, 75 x 150 ft., one story, and 50 x 75 ft., two stories, to be erected by the company. A. Jacoby, 59 South Bellevue avenue, Atlantic City, N. J., is general manager.

The Leeds Company, Atlantic City, N. J., has awarded a contract to P. G. Hannum, 16 North Georgia avenue, Atlantic City, for an addition to its power house, 14 x 40 ft., three stories, of brick construction.

Parkesburg, Pa., has authorized a loan of $28,000 for building a sanitary sewer system and disposal plant.

The New Kensington Soap Company, New Kensington, Pa., has recently been incorporated. It plans to acquire a factory and will require some machinery at that time. D. S. Willyard is president and general manager.

Baltimore, Md., is preparing to install one or more turbine engines for its high-pressure lighting service at an approximate cost of $15,000.

The Dixie Lumber Company, Clifton Forge, Va., will install equipment for the manufacture of barrel bungs.

The Virginia-Western Power Company, Clifton Forge, Va., has been awarded an electric light franchise in Buchanan, Va.

The Roby Cleaning & Polishing Machine Corporation, Staunton, Va., expects to let a contract for the manufacture of its patented machine.

Chicago

CHICAGO, ILL., February 23, 1915.

Purchases of machine tools and other factory equipment the past week have surpassed in value business of any previous week of the year. By no means all of this business can be attributed, directly or indirectly, to buying for war purposes. The city of Chicago, for its municipal plant, has let contracts for a few additional tools. The Warner Gear Company, previously mentioned as being in the market, today placed its orders. A contract was let today for the erection of an addition to the plant of the Foster Machine Company, Elkhart, Ind., this addition being rendered necessary by reason of large export and domestic orders. Considerable new equipment has been purchased. The railroads are doing no buying, and it would appear that the renewal of shop equipment is to be the last thing for which provision is to be made.

L. S. Neuschul, of M. Mett & Co., machinery dealer, Petrograd, Russia, has made arrangements to represent in that country, thus replacing German manufacturers, the Foster Machine Company, Elkhart, Ind.. Wolcott & Wood Machine Company, Jackson, Mich.; Rockford Milling Machine Company and W. F. & John Barnes, Rockford, Ill. Purchases for stock on these accounts are large, among them the buying of upward of 50 screw machines from the Foster Machine Company. In the establishment of these new relations, there are those who see a well-defined intention on the part of dealers in the countries of the Allies, to supplant their German machines by American lines of tools.

The Rayfield Machine Company, Chicago, has been incorporated with a capital stock of $1500 to manufacture automobiles and accessories. The incorporators are John F. Rayfield, Henry E. Fernerstein and Enos A. Bates, 4528 Oakenwald avenue.

The Western Automatic Meter Faucet Company, Chicago, has been organized by Frank F. Marshall, Frank Schorik and Adolph J. Schinagle, with a capital stock of $25,000.

The Safety First Appliance Mfg. Company, Chicago, will manufacture motorcycle whistles, pumps and accessories, etc. The incorporators are Benjamin S. Mesirow, 111 West Monroe street; A. G. Rosenbaum and R. H. Klein, and the company will have a capital stock of $5000.

The Auditzer Company, Chicago, has been incorporated with a capital stock of $5000 to deal in machines, machinery devices, etc. The incorporators are Harry Goodman, 133 West Washington street; Wm. R. Swissler and Harry A. Pillman.

Ben Rigby, Inc., Chicago, has made application for corporate charter providing for a capital stock of $10,000, to manufacture hot water, steam and hot-air heating apparatus. The company is organized by Ben Rigby, 545 West Lake street; T. J. Mullen and H. W. Beaton.

The Chicago District Garage Company, Chicago, incorporated with a capital stock of $15,000, will engage in the garage business, manufacture and repair automobiles, etc. The incorporators are F. C. Hamilton, 5130 Drexel boulevard; J. H. Delany and H. T. Chace.

The Paint Products Company, Railway Exchange Building, St. Louis, has signed a lease for property on the Southern Railway in East St. Louis, Ill., and will establish a paint manufacturing plant. The plant will install equipment worth $100,000.

The Peoria Tractor Company, Peoria, Ill., organized with a capital of $60,000, will manufacture tractors and farm implements. The incorporators are George McFarland, C. F. Loomis and E. M. Smith.

The South St. Paul Machinery Company, St. Paul, Minn., has been organized with a capital of $25,000 by Emil Gardie, South St. Paul; Marion M. Hill, St. Paul, and J. Lynd Evans, Minneapolis.

Schleswig, Iowa, is reported to have appropriated $16,000 for the construction of a municipal electric light plant.

The National Steel Post Company, Cedar Rapids, Iowa, recently incorporated with a capital stock of $250,000, has purchased the patents and plant of the Slauson Mfg. Company, Cedar Rapids, manufacturer of steel fence posts and similar farm equipment. It is now operating a leased factory, but plans to build a factory 60 x 200 ft. It is in the market for a hot galvanizing plant and a gang punch, adapted to the use of rail carbon work. Luther A. Brewer is president, and L. E. Slauson, general manager.

The citizens of Minto, N. D., are considering the construction of an electric light plant.

E. P. Farley, 1113 Hennepin avenue, Minneapolis, Minn., tire repairer and vulcanizer, has announced that he will build an addition to his shop.

Kinney, Minn., has voted $20,000 to build a municipal waterworks system.

St. Paul, Minn., will call for bids within the next few weeks, for bonds, of which $150,000 worth will be used for water supply purposes.

Mineral, Kan., has voted to drill wells and purchase pumping machinery.

The city clerk, Sisseton, S. D., will receive bids until 2 p. m., March 2, for a sewage treatment plant, etc.

William Backer, city clerk, New Ulm, Minn., will receive bids until March 2 for a deep well pump.

Milwaukee

MILWAUKEE, WIS., February 20, 1915.

Gradually increasing payrolls in metal-working shops in this district are the most impressive signs of improvement in business at this time. A significant enlargement of working forces the past week has been in the locomotive and boiler division of the West Milwaukee shops of the Chicago, Milwaukee & St. Paul Railway. Machine-tool builders have reason to be more optimistic than for a long time, through a more satisfactory run of domestic orders and better inquiries. Trade is by no means up to the point it should be, but signs point to a solid and substantial resumption of demand. War business is growing stronger and is taking on a wider and more miscellaneous character.

The Allis-Chalmers Mfg. Company, Milwaukee, is figuring on a contract with the Bethlehem Steel Company for certain machine work covering a considerable period. According to Otto H. Falk, president, the proposed contract contains no specific directions with respect to the class and kind of work, but it is presumed to be gun carriages, shells, etc. The Allis-Chalmers Company will simply do the finishing operations and reship to the Bethlehem Company for final disposition.

The United States Wheel & Tire Company, Rockton, Wis., organized recently, is preparing to erect a plant, 100 x 110 ft., two and one-half stories, of brick, steel and concrete, to be equipped for the manufacture of elastic wheels for automobiles and motor trucks. The company is capitalized at $300,000. E. S. Gleasman is president.

Eugene Frey and Harvey S. Zillhart, Delavan, Wis., have organized a partnership under the style of Frey & Zillhart to do a general sheet metal working and machinery business. Equipment has been provided. The new Chesebro factory has been leased.

The Key Safe Company, Milwaukee, has been incorporated with $25,000 capital by F. H. Becker, Frank X. Bergs and Joseph J. Zimmermann.

G. S. Everhart, Oshkosh, Wis., has organized the Giant Grip Horseshoe Company to manufacture horseshoes and calks. The capital stock is $100,000.

The B. J. Johnson Soap Company, Milwaukee, is contemplating the erection of a brick, steel and reinforced concrete factory addition, six stories, this year. Plans will be prepared at once. Caleb E. Johnson is president.

Indianapolis

INDIANAPOLIS, IND., February 23, 1915.

The L. & G. Mfg. Company, Indianapolis, has been incorporated with $3000 capital stock, to manufacture machinery and mechanical devices. The directors are Albert Lieber, J. J. Gaynor and P. C. Lieber.

The American Standard Motor Company, Indianapolis, has been incorporated with $100,000 capital stock, to manufacture automobiles, automobile trucks, etc., by Henry B., James P., and Leo A. Gardner.

The States Motor Car Company of Indiana, Indianapolis, has been incorporated with $30,000 capital stock to manufacture automobiles and parts, by R. C. Cope, W. B. Smith and Walter Myers.

The Broderick Boiler Company, Muncie, Ind., has received an order for 150 boilers, and the plant, which has been shut down several months, will resume operations.

Mitchell, Ind., proposes to build a new electric light plant, the demands of the city having outgrown the plant installed twenty years ago.

The Modern Refrigerator Company, Peru, Ind., has been incorporated, with $25,000 capital stock, to make refrigerators and do general manufacturing. H. T. Ader, J. A. Kader, Jr., and J. F. Unger are the directors.

The Peter Klerner Furniture Company, New Albany, Ind., has been incorporated, with $50,000 capital stock, to manufacture furniture.

The Monon Waterworks Company, Monon, Ind., has been incorporated with $40,000 capital stock, to supply water to the municipality. The directors are E. L. Smith, G. M. Hornecker and W. F. Brunt.

The Plymouth Mfg. Company, Plymouth, Ind., has increased its capital stock to $65,000.

The North Manchester Foundry Company, North Manchester, Ind., has increased its capital stock to $20,000.

The board of works, Ft. Wayne, Ind., will soon call for bids for a 800-hp. boiler to replace two 300-hp. units.

The Albany Cabinet Company, New Albany, Ind., recently incorporated, has rented a factory and does not plan any further expansion for some time to come. O. E. Ellis is general manager.

The Public Utilities Company, Evansville, Ind., is building a new power station.

The board of public works, Anderson, Ind., plans to buy this year a 3000-kw. generator and a 500-hp. boiler, as well as electrical supplies.

The LaGrange Electric Light Company, LaGrange, Ind., will buy two 150-hp. boilers, one 250-hp. engine and one 150-kw. generator within the next few months.

Cleveland

CLEVELAND, OHIO, February 23, 1915.

The foreign demand for lathes continues active. Some inquiry is being made among dealers for machines for export out of their stocks. Reports from the East indicate that many second-hand lathes have been purchased for shipment abroad. The local machine-tool market shows little change. Dealers are doing a fair volume of business in one or two tools. There are no new inquiries of any size pending, but some business is in prospect that will eventually mean the placing of fair-sized orders. In this respect the market outlook shows an improvement.

The city of Cleveland will receive bids through its commissioner of purchases and supplies March 5 for two coal and ash conveyors and for seamless steel tubing for the water works department.

It is stated that the Faultless Anchor Company, Fostoria, Ohio, will enlarge its factory.

The Burger Iron Company, Akron, Ohio, has increased its capital stock from $125,000 to $375,000 to provide for factory additions. Newly elected officers of the company are: J. A. Rohner, president; J. G. Bachman, vice-president; J. A. Burger, secretary and general manager, and G. A. Rohner, treasurer.

The Swinehart Rubber & Tire Company, Akron, Ohio, is having plans prepared for a three-story reinforced concrete and brick factory addition, 60 x 130 ft.

The Mathers Spring Company, Toledo, Ohio, has awarded a contract for the erection of an addition to its plant.

The National Cornice Company, Lima, Ohio, is adding some new machinery to its plant and will largely increase its output. It also expects to branch out in other lines of sheet metal work.

Cincinnati

CINCINNATI, OHIO, February 23, 1915.

An unusual condition exists in the machine-tool business in Cincinnati. Manufacturers of shapers, radial drilling machines and planers have little to do, and nothing of any account on their books. Lathe builders are very busy. One large local manufacturer recently turned down an order for approximately $200,000 worth of lathes. This was not because his shop was busy, but two commissions were to be taken care of, thus reducing the profit to a minimum, and at a time when skilled labor is scarce and therefore uncertain. One of the leading machine-tool manufacturers, making a varied line of equipment, is absolutely turning down foreign business, because he anticipates a better demand from his domestic agents soon, and he feels that it is better policy to be able to take care of his home customers. A large buyer of machine tools who was in the city last week placed orders for lathes for delivery as far ahead as next June. However, a foreign agent, who was also here, is authority for the statement that should the war in Europe suddenly cease lathes will be a drug on the market, but should it continue much longer no such situation will arise, as the majority of this class of machines that were put into use at the beginning of the war are already in the scrap heap.

The Century Machine Company, Winton place, Cincinnati, manufacturer of bakers' machinery, has purchased the equipment of the Modern Machine Tool Company, now in the hands of a receiver.

Some extra power plant equipment will probably be required later by the Cincinnati Sanitarium, College Hill, Cincinnati.

The Blair Motor Truck Company, Newark, Ohio, has increased its capital stock from $100,000 to $225,000, and will add to its manufacturing facilities.

The Central South

LOUISVILLE, KY., February 23, 1915.

Prospects are better now than they have been for several months. The number of new industrial enterprises which are being started is good evidence of a better feeling on the part of manufacturers. Companies handling both power and special equipment are figuring on a larger number of installations than they have recently had. Jobbing work and repairs continue to keep machine shops and foundries busy, and with the new work which is coming in, it looks as though the spring season will be more active than had been anticipated. Power machinery is moving better than for some time.

The Mengel Box Company, Louisville, has been purchasing equipment for a panel plant at Hickman, Ky.

The factory of the Rosemary Gum Company, 2314 Garland avenue, Louisville, was burned last week with $5000 loss.

A. C. Craft, Sergent, Ky., will install a sawmill at Thornton Creek, Ky.

Bond Brothers, Elizabethtown, Ky., are planning the erection of a handle and furniture factory.

Sebree, Ky., has rejected bids for the purchase of $14,000 of waterworks bonds, and will call for new bids March 1.

W. H. Winfield, Franklin, Ky., will receive bids until March 1 for two turbine electric pumps.

Anton Bodner, Danville, Ky., has arranged for the erection of a planing mill. Power and wood-working equipment will be needed.

Herbert Bailey, Stanford, Ky., is equipping a garage and automobile repair shop, for which machine tools will be required.

The Beaumont Hotel, Hazard, Ky., will install a private electric light plant.

The Kentucky Electrical Company, Owensboro, Ky., has taken over the Barbee Airgrate Company, Owensboro, and will manufacture its product hereafter in its own plant.

Additional coal handling equipment will be installed in the municipal electric light plant at Paducah, Ky. The city commissioners are in charge.

The Clinchfield Portland Cement Company, Kingsport, Tenn., has let a contract for the erection of an addition to its plant.

The mill of the R. S. Parks Stave Company, Tiptonville, Tenn., was burned recently with $5000 loss.

The American Lime, Phosphate & Fertilizer Company, Centreville, Tenn., will install a rock-crushing plant at Bon Aqua, Tenn., for manufacturing ground limestone. J. H. Dean is manager.

Pulaski, Tenn., has made arrangements to replace an oil engine with a steam engine at the electric light plant.

South Boston, Tenn., has appropriated $10,000 for the improvement of the municipal electric light plant.

Birmingham

BIRMINGHAM, ALA., February 20, 1915.

The machinery and machine tool market is gradually improving. Both sales and inquiries are greater. Foundry operations have increased and the general demand in the business shows a betterment without special features. Southern agricultural interests appear to have weathered the storm and are in condition to buy equipment for spring and summer purposes.

Notasulga, Ala., will receive bids until March 2 for the installation of a waterworks system. Edgar B. Kay, Tuscaloosa, is the engineer in charge.

The Diamond Coal Company, Cordova, Ala., will install electrical machinery in the development of 800 acres of coal lands. The daily capacity is to be 200 to 250 tons. W. G. Lunsford, Brown-Marx Building, Birmingham, is secretary.

Theodore Goull, Birmingham, it is reported, will establish an extensive lime plant near Gadsden, Ala.

Phoenix City, Ala., has voted $15,000 of bonds and intends to erect a waterworks system.

The Oconee Mills, Milledgeville, Ga., is constructing a hydroelectric plant at a cost of $100,000.

The Manatee Fruit Company, Palmetto, Fla., will establish a packing plant at a cost of $30,000 in place of one recently burned. J. H. Preston and W. L. Preston, Tampa, Fla., are among the principal stockholders.

Plans have been drawn for the construction of a new plant for the Charleston General Asbestos & Rubber Company, Cumberland street, Charleston, S. C. It will be erected in North Charleston, and will more than double the output. The present equipment will be removed to that site, and the improvements will cost approximately $175,000.

Winston-Salem, N. C., has sold $50,000 of bonds for a sewage disposal plant.

La Grange, N. C., will issue $50,000 of waterworks and electric light bonds.

Walterboro, S. C., has sold $18,000 of bonds for the enlargement of the waterworks plant and $12,000 of bonds for the installation of a sewage system.

St. Louis

ST. LOUIS, MO., February 20, 1915.

Coupled with the recent steady improvement in the machine-tool business, the past week gave some evidence that other centers have been drawing on St. Louis for equipment to meet demands caused, particularly in the East, by the shipment of certain types of tools to Europe. No specific requests, however, have been received at this point for tools for direct export so far as has been reported. A slight but steady gain in the demand from the territory immediately tributary to St. Louis is reported, and the continuance of this maintains the optimism of the dealers. New enterprises are being announced in larger numbers, and many existing plants are considering extension and replacement. With all this encouragement, no large lists have been brought out, and the increase in business has come from the single tool business. Collections are reported better, and banking conditions more satisfactory as to funds for permanent investment purposes. Second-hand tools are in some request.

Fire in plant No. 3 of the Laclede-Christy Clay Products Company, St. Louis, entailed a loss estimated at $100,000, largely on mechanical equipment for making high-grade brick. It will be re-equipped at once.

The F. W. Hampeter Furniture Company, St. Louis, will install wood-working machinery as a result of increased demand.

Barnard, Mo., will install an electric lighting system.

The Thermo-Automatic Stove Company, St. Louis, Mo., has increased its capital stock from $10,000 to $50,000.

The Wuldman Mfg. Company, St. Louis, has increased its capital stock from $10,000 to $17,500.

The Electric Garage & Service Company, 5187 Delmar boulevard, St. Louis, is reported in the market for equipment for its repair plant and garage.

The Peoria Stone & Marble Works, Peoria, Ill., has been authorized to utilize $40,000 of its $150,000 capital in Missouri with a plant at Columbia, Mo.

The Adjustable Shade Hanger Company, Joplin, Mo., has been incorporated with a capital stock of $25,000 by George B. Wood, Thomas Douglas, and John T. Evans.

The Kansas City Motor Bus & Transportation Company, Kansas City Mo., has been incorporated with a capital stock of $12,000 by Earl C. Beig, J. A. Daniels and S. P. Daniels.

The Colbert Machinery Company, St. Joseph, Mo., has been incorporated with a capital stock of $15,000 by J. P. Colbert, R. C. Noler and E. T. Nelson.

The Kelley Mill Company, Kansas City, Mo., has been incorporated with a capital stock of $500,000 by John, Arthur B. and John M. Kelley.

The Hume Electric Company, Hume, Mo., is contemplating the installation of equipment for canning fruits and vegetables. J. J. Ross is manager. The electric plant, yet to be built, will require about $5000 worth of equipment.

J. M. Yarbrough and T. W. Wade, Baker Building, Springfield, Mo., are to equip a cannery at Rich Hill, Mo., with a daily capacity of 10,000 cans.

The W. E. Callahan Company, Omaha, Neb., and the T. C. Stevens Company, Des Moines, Iowa, have the contract for about $300,000 of drainage work in and about Hannibal, Mo.

Deepwater, Mo., has voted bonds for the equipment of an electric light plant. The mayor is in charge of the work.

An electric light plant to cost about $11,000, will be installed at Hale, Mo., by W. L. Rollins & Co., engineers, Kansas City, Mo.

The Kennett Ice & Electric Company, Kennett, Mo., will install an electric light and power plant.

The Fortune Teller Mining & Milling Company, Granby, Mo., of which C. H. Scholes is manager, will replace its mill, installing two 100-hp. boilers, one 65-hp. engine compressor, jigs, etc., at a total cost of about $11,000.

Caruthersville, Mo., has voted $32,000 of bonds and will install a sewer system with disposal plant, etc. Frank L. Wilcox, St. Louis, is the engineer.

Chillicothe, Mo., under a voted bond issue of $135,000, will buy the local waterworks plant and install new equipment to increase its capacity.

F. C. Hoyt, Newark, Ark., is preparing for the installation of a large canning plant and is in the market for power and other equipment.

The Mena Brick & Clay Company, Mena, Ark., has been incorporated with a capital stock of $25,000 by G. W. and L. F. Conklin and D. B. Simpson and is now in the market for machinery and a power plant.

M. Bryant, Ashdown, Ark., will purchase the municipal electric light plant at Gravette, Ark., and will improve and increase its capacity.

An electric light and power system will be installed at Russellville, Ark., by Edward H. Crow, St. Louis, Mo.

The Riel-Kadel Lumber Company, Nashville, Ark., has increased its capital stock from $30,000 to $100,000.

A hardwood mill is to be installed by J. H. Allen, Nashville, Ark. He will also lease and operate the box factory of the Graysonia-Nashville Lumber Company.

Kiefer, Okla., will proceed at once with the equipment of a waterworks plant to cost about $60,000.

Red Rock, Okla., has voted $22,000 in bonds for a waterworks. The Benham Engineering Company, Oklahoma City, Okla., is the consulting engineer.

Asphalt property at Jumbo, Okla., is to be developed at once by John D. Townsend, W. Lee Brown and W. T. Gulledge, Arkadelphia, Ark., and they are in the market for equipment for the manufacture of roofing, paints, varnishes, etc., to cost about $40,000.

The Lamar Lumber Company, Clyde, Miss., has been incorporated by G. L. Hawkins, V. M. Scanlon and associates, with a capital stock of $350,000.

A plant for the manufacture of culverts, etc., will be established at once by E. W. Humphries & Co., Columbus, Miss.

J. N. Brownlee, Shubuta, Miss., is building a plant for the manufacture of steam engines and steam specialties. He is in the market for a boring machine, etc. The daily capacity is to be 5 to 10 engines.

Thompson & Dupont, New Orleans, La., have acquired timber lands near Ellisville, Miss., and will install mills to work it up.

The Poplarville Machine & Boiler Works, Poplarville, Miss., has been burned with a loss of about $13,000.

The plant of the Rex Planing Mill Company, Meridian, Miss., has been burned with a loss of $10,000. It will be replaced.

The Vinton Ice, Light and Water Company, Vinton, La., has been incorporated with a capital stock of $20,000.

Bastrop, La., has voted $16,000 for increasing the capacity of its waterworks and electric generating equipment.

Levy & Co., Ama, Ala., will install cooperage plants at Ama and at St. Rose, La.

Texas

AUSTIN, TEXAS, February 20, 1915.

While trade activity is not yet up to normal, a steady improvement in conditions is reported. A long period of fine weather has stimulated all lines of business. Farmers are well advanced with the crop preparations and everything points to another good season.

The Ingersoll Patent Clothespin Company, Houston, has been organized to manufacture clothespins by C. J. Ingersoll and others.

The Stowell Canal Company, Beaumont, has increased its capital stock from $40,000 to $90,000 for the purpose of enlarging its irrigation system.

James C. Hancock, Paradise, Ariz., and associates, plan to build a sawmill in the Chiricahua Mountains.

The Upper Verde Utilities Company, Jerome, Ariz., which recently purchased the waterworks and electric light plants at Jerome and the waterworks plant at Clarksville from the United Verde Copper Company, will make improvements to the properties.

The wood-working plant of the Bettis Mfg. Company, Beaumont, which was recently purchased by W. C. Tyrell and associates, will be converted into a rice mill.

The Texas Saddlery Company, Fort Worth, has been organized with a caphal stock of $120,000 by J. G. Wilkinson and others.

The Oakoal Company, Austin, plans to build a factory for manufacturing a patent fuel. R. E. Wallis is in charge.

S. A. Whiteside, Roswell, N. M., will rebuild his machine shop which was recently destroyed by fire.

San Francisco

SAN FRANCISCO, CAL., February 16, 1915.

Interest is centered on the opening of the Panama-Pacific Exposition, to take place February 20, which tends to retard business somewhat at the moment. Few orders for new machine tools have been booked in the last fortnight; but figuring is in progress on a few good-sized propositions, from which business is expected within a few weeks. One encouraging development is the placing of a contract with the Union Iron Works for construction of a 10,000-ton steamship, with the announcement that the plant will build another similar vessel for its own account. Local merchants have received notice from several builders that delivery of certain types of lathes, etc., cannot be promised before August; and with inquiries for such tools from stock, from points outside this immediate territory, a shortage is expected. The prospect of multitudes of people in the city this year has led to the purchase of considerable new machinery by local industries, such as bakeries, laundries, etc., and these lines are expected to continue active through the spring. Demand for cannery equipment is increasing, with some foreign inquiry; and trade in implements, pumps, etc., is developing nicely. Contractors' and quarry machinery is quiet, although prospects for road-building equipment are good, and one or two cement manufacturing projects are expected to come through within the year. Wood-working machinery remains dull.

The Pacific Coast Steel Company, South San Francisco, is installing some new motors in its rolling mill.

The Standard Oil Company, Richmond, Cal., is starting work on a new boiler house at its refinery. It will install 20 200-hp. boilers.

Batey Brothers, Elk Grove, Cal., who have been operating a machine shop under lease, are preparing to build and equip a new shop at that place.

Plans are being figured for an addition to the power plant and boiler equipment of the United States Marine Hospital, San Francisco.

H. B. Claflin, 25 East Adams street, Phoenix, Ariz., is manager of a new company for the manufacture of a gas machine.

The Pacific Northwest

SEATTLE, WASH., February 16, 1915.

Business in the machine-tool line is not showing any marked activity, although a few small orders have been placed, and a number of inquiries received. The demand for mining machinery is very encouraging, and a number of such shipments have been sent to Alaska.

Salmon packers throughout the Northwest are particularly optimistic, predicting that, as a result of the war and the high cost of beef and other food products in the United States, the next season will be the greatest in the business. The Pacific American Fisheries Company, Bellingham, in anticipation of this market, has planned an order for $190,-

000 worth of new machinery, which will be installed in its different canneries. This company has also purchased several large properties in Alaska, and will begin the construction of packing plants.

The Simonds Saw Mfg. Company, 119 Jackson street, Seattle, has taken over the plant of the Washington Saw Company, and will enlarge it.

The Doernbecher Mfg. Company, East Twenty-eighth street, Portland, Ore., manufacturer of furniture, will have the addition to its factory completed in about six weeks, when it will immediately start the construction of a six-story factory addition, 100 x 150 ft., to cost about $60,000. These buildings will be used largely for warehouse purposes.

The Springfield Planing Mill Company, Springfield, Ore., will rearrange its plant to provide for the addition of a furniture factory. H. E. Pitts is secretary.

It is probable that the plant of the Yakima Sash & Door Company, North Yakima, Wash., closed some time ago, will be reopened, new machinery installed, and operations started. C. A. Warnstrom, Tacoma, is president.

The Stetson & Post Lumber Company, Seattle, Wash., announces that its new mill now under construction will be electrically operated. Eighteen induction motors ranging from 75 to 5 hp. will be installed, and will total 400 hp.

The Gas Service Corporation, Auburn, Wash., has announced that preliminary plans are practically completed for construction of the following gas plants, estimated to cost as follows: Montesano, $40,000; Aberdeen, $80,000; Elma, $40,000, and Hoquiam, $60,000.

The box factory of the Coquille River Mfg. Company, Bandon, Ore., has been purchased by the Robert Dollar Company, and the First National Bank of Bandon. It is understood that the new owners plan immediate improvements and will increase the output.

C. C. Shulz, Belmont, Mont., is at the head of a syndicate which will install machinery in a coal mine near Belmont.

Ashland, Ore., has disposed of $175,000 worth of water bonds, recently voted, and will construct a municipal waterworks system. Work will begin within 60 days.

The plant of the Superior Sash & Door Company, New Westminster, B. C., was seriously damaged by fire recently, with an estimated loss of $100,000. Practically all the machinery was burned.

The American-Japanese Company, Everett, Wash., has been incorporated for $1,000,000 to develop silica-bearing lands. It plans the initial expenditure of $20,000, and it is stated that machinery orders will be placed within 30 days.

The plant of the Western Hardwood Mill Company, Morton, Wash., has been purchased by J. H. Richards, Morton, and the name of the company changed to the Morton Hardwood Lumber Company, which plans the erection of a furniture factory, electrically operated. It will also install machinery to increase the output.

The plant of the Bailey-Dubois Sash & Door Mfg. Company, Seattle, Wash., was completely destroyed recently, with a loss of more than $35,000. It is reported the plant will be rebuilt.

The Bellingham Bay Brewery Company, Bellingham, Wash., has announced its intentions of converting its brewery into a cold storage fruit and dairy plant. Henry Schupp and Peter G. Schmidt are in charge.

The plant of the Kent Lumber Company, Barneston, Wash., including dry kilns, sawmill and lumber sheds, were damaged by fire recently, with a loss of about $20,000. The planing mill was completely destroyed. The company will rebuild.

The Pacific Iron Works, Portland, Ore., has moved to its new plant between East Thirtieth and East Thirty-second streets. The new shops are 600 ft. and the foundry and pattern building 400 ft. long.

Eastern Canada

TORONTO, ONT., February 23, 1915.

The railroads have made application to the Dominion Railway Commission for permission to increase freight rates in eastern Canada. They ask for an increase of 2c. per 100 lb. in first class and 1c. in fifth class, other classes to be figured on the usual basis. On coal and coke they ask for an increase of 10c. per ton. The advance asked on pig iron, billets, rails, wire rods, iron ore concentrates, runs all the way from 5 to 30c. per ton.

The Chatham Malleable & Steel Mfg. Company, Ltd., Chatham, Ont., has been incorporated to manufacture stable equipment. W. H. Westman is president, Ross Huff vice-president and A. D. Westman, treasurer.

The Colonial Construction Company, Ltd., St. John, N. B., has been incorporated with a capital stock of $24,000 to manufacture lime, brick, etc.

The City Council, London, Ont., is in the market for machine tools for the works department. It contemplates the purchase of pumps and motors. H. A. Braizier is city engineer.

Turbine pumps and motors will be required for the new pumping station at Hamilton, Ont. A. F. Macallum is city engineer.

Renfrew, Ont., is to spend $16,000 on a new electric light system.

Laing, Libby & Co., Boston, Mass., have purchased the plant of the Canadian Sardine Company, Chamcook, N. B., for about $1,000,000, and will erect a large cold storage plant.

The sawmill of Anglin & Co., Kingston, Ont., was destroyed by fire February 16, with a loss of $15,000.

The Abitibi Pulp & Paper Company, Iroquois, Ont., is to install four paper-making machines. Two are to be in operation by May 1, another in July, and a fourth in the fall.

The Canada Universal Nut Lock, Ltd., Toronto, has been incorporated with a capital of $100,000 to manufacture nut locks, hardware specialties and machinery. John M. Robinson, James Boothe, John D. Bissett and Theodore H. Peine, Toronto, are the incorporators.

Commercial Electrics, Ltd., Toronto, has been incorporated with a capital stock of $500,000 to manufacture and do business as electrical engineers. Among the incorporators are George R. Kapple and George H. Morgenstern.

The American Equipment Company of Canada, Ltd., Montreal, has been incorporated to manufacture and deal in metal goods, tools, machinery, etc. William K. McKeown and Henri Lacerte, are among the incorporators.

The Kenith Machine Company, Ltd., Montreal, has been incorporated with capital stock of $50,000 to carry on business as a manufacturer, plate maker and iron founder, by J. W. Blair and F. J. Laverty, Westmount, Que., and Charles A. Hale and Auguste Augers, Montreal.

The F. E. Coome Furniture Company, Ltd., Kincardine, Ont., has been incorporated to manufacture furniture and do a wood-working business with a capital stock of $100,000. Among the incorporators are Frank E. Coombe and H. R. Magwood, Kincardine; George Davidson, Woodstock, Ont., and William J. Craig, Toronto.

George McKean & Co., Ltd., St. John, N. B., has been incorporated to manufacture lumber with a capital stock of $100,000. William K. and George R. McKean, W. E. Golding, F. R. Taylor and Oscar Ring, St. John, are the incorporators.

Souris, P. E. I., is planning to install a small waterworks system and pumping plant.

A factory for the manufacture of automobile and carriage heaters is to be equipped by the Auto Heater Company, Ltd., Toronto, Ont., which was recently incorporated with a capital stock of $150,000.

Government Purchases

WASHINGTON, D. C., February 23, 1915.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, March 16, schedule 7978, for two overhead trolley hoists for Newport; schedule 7979, three portable pneumatic geared hoists for Norfolk; schedule 7980, miscellaneous oil pumping machinery for Portsmouth, Brooklyn and Norfolk; until March 23, schedule 7971, miscellaneous chain and worm gear blocks; until April 6, schedule 7960, two lubricating oil pumps, two main air pumps and two main feed pumps, all for Mare Island.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, February 16, for supplies for the navy yards, as follows:

Schedule 7861, Yards and Docks, Class 101, Port Royal—Two 50-hp. fire-tube boilers, with accessories—Bid 5, informal; 110, $576; 123, $1076, $943, $952, $818 and $733; 162, $814.20, informal; 168, $660, informal; 208, $475.50; 216, $1543; 253, $525; 263, $694; 302, $565; 315, $1550.

Schedule 7862, Construction and Repair, Class 111, Norfolk—One pneumatic compression yoke riveter—Bid 16, $500, informal, and $525, informal; 73, $552; 235, $499; 316, $1046.

The names of the bidders and the numbers under which they are designated in the above list are as follows:

Bid 5, Ames Iron Works; 16, Chester B. Albree Iron Works Company; 73, Chicago Pneumatic Tool Company; 110, S. Freeman & Sons Company; 123, A. D. Granger Company; 162, Kingsford Foundry & Machine Works; 168, E. Keeler Company; 208, L. R. Merritt & Co.; 216, The Marine Boiler Works Company; 235, D. Nast Machinery Company; 253, Phoenix Iron Works Company; 263, Howard W. Read Company; 302, The Titusville Iron Company; 315, Valk & Murdock Company; 316, Vulcan Engineering Sales Company.

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